The Builder.

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Doorway, St. Mary's Church, Moorfields, E.C.
Spencer House, South-place, Finsbury, E.C. } ....Mr. George Sherrin, F.R.I.B.A., Architect.
Wall-Paintings, St. Augustine's, Tunbridge Wells....By Mr. N. H. J. Westlake.
Competition Design for Wesleyan Hall, Westminster....By Mr. W. F. Harber.

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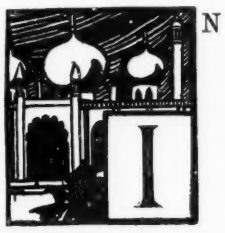
The Story of the Salton Sea.—II.



IN January, 1905, before the inundation had reached its final proportions, the irrigation company endeavoured to dam the entrance to the intake by driving piles, 50 ft. long by about 6 in. square, at intervals of 3 ft. apart, and the spaces filled in with fascines and bags of sand. The difficulty of getting piles to remain in the breach will be at once evident when we state that the sides and bottom of the Colorado River consist of nothing but silt, so deep that its bottom has never been reached by any borings hitherto undertaken. Moreover, the silt is as fine as flour and seems literally to melt away in contact with flowing water. It is not surprising then to learn that the pile and brushwood dam was washed away before it could be completed. As this untoward result was attributed to the insufficient supply of bags for sand, the company, with the financial support of the Imperial Water Company, made a second attempt to close the mouth of the intake in the month of May, 1905.

The site of the second attempt was a little lower down than that of the first, as may be seen by Fig. 2 (see page 213 *ante*). Once more piles were driven into the silt, but this time in two parallel rows with brushwood and sand in bags between them. The only effect of the barrage, so far as it could be completed, was to divert the main stream to one side, where the banks were cut out proportionately to the advance of the structure. Consequently the effect of this attempt was merely to widen the gap, and work was abandoned as hopeless in the succeeding month of June, 1905.

By that date large tracts of land were inundated along the Alamo and New rivers, and the main area of the irrigated lands was only saved by energetic work on the construction of embankments. The Salton basin had become flooded to so serious an extent as to drown out the undertaking of the New Liverpool Salt Company, and to threaten the destruction of the Southern Pacific main line for a length of some forty miles. Finding that the funds of the irrigation company were exhausted, the railway company realised that decisive measures were imperative. Mr. Epes Randolph, an eminent American engineer with valuable experience of river floods, was commissioned to deal with the matter.

The third attempt, made under his direction, somewhat followed the practice extensively and successfully adopted on the Mississippi. In July, 1905, a line of piles was driven and packed with fascines and bags of sand, so as to prolong the eastern side of Disaster Island (see Fig. 2) in the hope that the accumulation of sand thereby induced on the Mexican side of the river would tend to divert the flow of water towards the American shore, and then to lead the river back into its former bed. The idea was a good one and additional reason for hoping that its realisation would have the desired effect was found in the fact that the eastern branch of the river was both wider and deeper than the western arm.

But, owing to the unstable character of the silt, the piles almost immediately began to show signs of being washed away. Hence a second row was driven to protect the piles in the first row, but the brushwood filling had scarcely been commenced when it became evident that the attempt was doomed to failure. The river, in fact, gave more than a hint to this effect by washing away the entire works. At the period now in question fully 65 per cent. of the river water was flowing down into the Salton Sea.

Attempt the fourth was represented by the commencement of a barrage, 600 ft. long, across the western channel of the river, and designed in accordance with the method adopted largely in Holland. The foundation of the work was formed of a brushwood platform, 18 in. thick and 100 ft. wide, in the direction of the river, held down by piles in three rows and packed with fascines. Commenced in October, 1905, this barrage progressed rapidly until November 28 in the same year, when a sudden flood coming from the Gila River washed everything away. The waters completely covered the island, worked round the back to the dam, washing away the head of the island, and cut the intake canal wider and wider, so that it shortly became the main channel of the river.

While the dam was still under construction, Mr. Randolph was thinking out other remedies in case of failure. One scheme was to convey water to the irrigation area by the original main canal,

diverted, at the southern end (*a*), as shown by dotted lines in Fig. 3, and supplied through a new channel to be cut above the first American intake, with a concrete-steel barrage founded on rock for controlling the flow. At the same time it was proposed to build a timber regulator (Fig. 3) to be placed in communication with the river by a by-pass channel, to be cut on the northern bank. By the aid of these works the engineers hoped to be able to turn the entire flow of the river through the by-pass channel before the arrival of the summer floods of 1906, and thus to facilitate the construction of a secure and permanent dam across the new bed of the river at the end of the branch line of railway, shown in Fig. 2.

Two days before the destruction of the brushwood dam, representing the fourth attempt, the construction of the concrete-steel barrage was commenced. This work, with sluices capable of passing nearly 10,000 cubic ft. of water per second, was completed before July, 1906.

In January, 1906, Mr. Randolph began to build the timber by-pass regulator and to cut the diversion channel for the main canal. Although no time was lost the work could not be completed before the arrival of the summer floods, and nothing could be done in the way intended. Thus the fifth attempt came to a premature end.

Unfortunately it happened that the

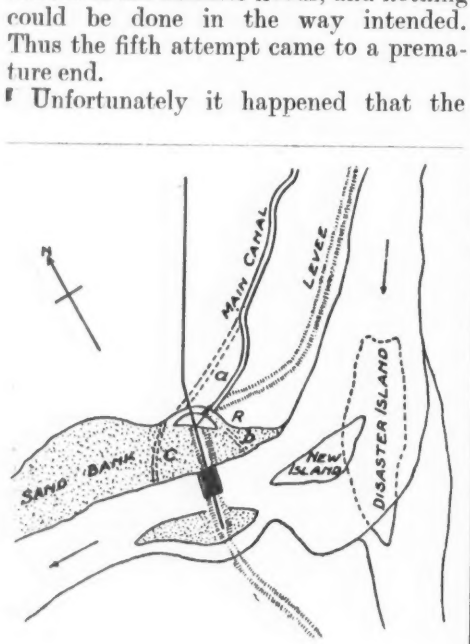


Fig. 3.

flood was exceptionally heavy, the result being that the channel near the new by-pass, only 600 ft. wide on March 28, was increased to the width of some 2,600 ft. by June 15. In proportion as the flow of water to the sea diminished, the new bed of the river changed, giving rise to deposits of silt and sand forming a new island and an extensive sandbank, the latter having the effect, as shown in Fig. 3, of blocking the channel on each side of the new timber regulator. Hence it became necessary to make the two cuts *b* and *c*. In July, 1906, the whole flood of the Colorado was pouring at the rate of nearly 100,000 cubic ft. per second down the valley, and not a drop of water found its way along the original channel towards the Gulf of California.

So heavy were the floods of 1906 that the level of the Salton Sea was raised by an amount estimated at three times that which would have been caused by an average year of rainfall and river discharge. The towns of Mexicala and Calexico suffered much injury, railway tracks were destroyed wholesale, and three or four times the lines of the Southern Pacific Railroad had to be removed to higher land.

Next began the sixth attempt, the general idea of which was the same as that of its immediate predecessor. That is to say, the flow of the Colorado was to be diverted through the by-pass channel and regulator so as to minimise the difficulties attending the construction of a dam across the main channel of the river. But the unfortunate results of the flood season had immensely increased the magnitude of the task before the railway company. In addition to the construction of a dam across an opening nearly 3,000 ft. wide, it was found necessary to build some five miles of levees along the down stream banks, and nearly four miles of levees between the timber by-pass regulator and the new concrete-steel barrage, to deepen the main canal for almost the whole of the same length, and to cut the new by-pass channels *b* and *c* through the sandbank then separating the river from the timber regulator. A branch railway line (see Figs. 2 and 3) 6 miles long, was laid up to the site of the dam ; quarries, gravel pits, and clay pits were opened, and preparations were made on a grand scale for the manufacture of brushwood mattrasses and fascines.

The whole region became one of great activity. Hundreds of men were busy in the quarries, pits, and brushwood yards, numerous teams of horses were engaged in hauling the materials up to the railway, dredges and steam excavators were hard at work in the excavation of silt from the main and new canals, mattrasses were laid across the river, protected and held in place by piles driven in two parallel rows and against these fascines, 18 in. diameter by 100 ft. long, were placed and held together by steel cables. The railway was extended by a double trestle viaduct carried along the centre of the mattrass foundation, and truck loads of stone, gravel, sand, and clay were discharged in hundreds and thousands, as fast as they could be brought up, to finish the work commenced by the mattrass foundations and the pile and fascine buttresses.

For a time all went well : thousands of cubic yards of stone, gravel, and clay had been deposited, and a fair proportion of the main flow was passing through the timber regulator.

Then, when victory seemed assured, the Colorado once more appeared as a relentless and obdurate foe, bringing down huge quantities of driftwood against the regulator, and causing such severe scour against its sides and bottom as to threaten immediate destruction. The engineers hurried to the site large quantities of stone and other materials, and made an attempt to save the structure by sheer weight, but the water found its way beneath the bottom, with the result that one half of the work was lifted bodily and carried a complete ruin down the river.

However, Mr. Randolph and his colleagues were not yet at the end of their resources. They determined to close the by-pass by three rock-filled dams. All the quarries within a radius of 400 miles were placed under requisition, three parallel railway lines were carried on trestle viaducts across the channel, and stone began to be tipped into the river bed at the rate of some 200 truck-loads a day. In sixteen days the breach was absolutely closed, water began to flow down the old channel, and on November 4, when the main dam reached its full height, the Colorado was completely turned into its natural bed for the first time since the original disaster.

The victory was short-lived, for on December 7, 1906, the river broke through the levee below the dam, worked round to the back, cutting away the levee and part of the dam, and in a few weeks the entire volume of the Colorado was once more cheerfully flowing into the Salton Sea, this time through a gap some 3,500 ft. wide. Here ended the sixth attempt.

Immediately after this outbreak, Mr. Harriman, the President of the Southern Pacific Railroad, addressed a telegram to Mr. Roosevelt, asking for the co-operation of the Government in the work of endeavouring to accomplish the apparently hopeless task before his company. Mr. Roosevelt replied on December 20, stating that the responsibility of closing the breach belonged properly to the California Development Company, but that owing to the importance of the question, he would bring it before Congress with a view to immediate action.

In a letter addressed to the Senate and the House of Representatives on January 12, 1907, Mr. Roosevelt related the circumstances attending the diversion of the Colorado River, pointed out that the occurrence was due entirely to the imprudence of the California Development Company, and suggested the desirability of acquiring that part of Mexico through which the irrigation channels passed on their way from and back into California. He estimated the cost of restoring the river to its natural course at 400,000*l*., in addition to the sums already expended, and suggested that Congress should take into consideration the reimbursement to the Southern Pacific Railroad of part of the money they had spent in the public interest.

The railway company were doubtless encouraged by the communication received from Mr. Roosevelt in December last, and, without waiting for further developments, at once started their last, and, so far, successful attempt to gain the victory over their indefatigable foe.

On December 20, 1906, three trestle viaducts were commenced across the new breach. They were built on rows of piles, from 65 ft. to 90 ft. long, driven at intervals of about 15 ft. apart, and carrying a platform of brushwood mattrasses. The construction of these viaducts was attended with much difficulty. Shortage of piles, and the refusal of the workmen to continue work after two days and three nights of icy rain caused some delay. A flood from the Gila River carried away a considerable portion of the pilework and some 250 ft. of the embankment, and the Colorado brought down so much *débris* as to render the work of pile-driving an exceptionally arduous task. It was even necessary to weight down some of the trestle bents

with water tanks to prevent them from being washed away, and one portion of the work was destroyed on three successive occasions.

On January 20, 1907, when the viaducts were finished and equipped with railway lines, the making of the dam was started. The engineering staff had at their disposal an army of nearly 1,300 men, several dredges, a steamboat, seven locomotives, and hundreds of railway trucks. Nearly 100,000 cubic yards of stone and 75,000 cubic yards of gravel and clay were run out upon the viaducts and tipped into the channel forming a dam which bravely held its place, and by February 26 had raised the level of the river by about 12 ft., and caused the river once again to flow back into the channel leading down to the Gulf of California.

Having for the moment gained the mastery of the river, the next point for attention was to consolidate in every way possible the dams, and the levees along the western bank. This work was at once taken in hand, and will be continued until all risk of further outbreak is at an end. The crest of the embankment, extending from the upper intake to the site of the intake which caused all the trouble, stands at the height of about 4 ft. above the level of the highest known flood, and Mr. Randolph believes that the works are capable of resisting any flood likely to come down the river. Moreover, it is very probable that the continued flow of water in the normal direction will have the effect of assisting the engineers in their efforts to increase the resistance of the restored bank.

Mr. Randolph and his able assistants are to be congratulated on the successful termination of their herculean task; they have certainly won a victory which stands second to none in the annals of engineering. To throw a barrage across a great river, in a place where masonry can be built upon solid rock, is a simple task as compared with the damming of a stream flowing over an almost unfathomable depth of fine silt affording no secure foundation, and ready to melt away at unexpected points on the least provocation.

Mere words absolutely fail to convey any adequate idea of the tremendous forces brought into play by the recent disruption or of the changes wrought in the face of the country. At one place where the Alamo River bed was in a slight depression the new channel is a gorge with vertical sides 80 ft. high and more than 1,100 ft. wide. At another place an overflow sluice, formerly in the bank of the Imperial canal, has been left high in the air. Deep gullies have been cut for long distances into the adjoining land, canals have been undermined and emptied, and towns once on land that was covered by several feet of water, now stand 40 ft. above the river.

In its irresistible rush across the valley, the river has cut out a channel nearly 100 miles long by some 1,500 ft. wide by from 60 ft. to 80 ft. deep. Formed in a few short months, this channel is twice as long, nearly ten times as wide and nearly twice as deep as that to be cut for the Panama Canal by years of labour. The quantity of material carried down to the Salton Sea is estimated at nearly 500 million cubic yards, and according to the estimate made by the United States Reclamation Service, the damage that would have resulted had not this break been closed, would have amounted to 140,000,000*l*. The area of the Salton Sea is approximately 400 square miles, and according to estimates made by experts it will be dried up by evaporation in the course of about eight years.

The engineers who have triumphed over the Colorado River can show no imposing structure as the result of their fight, but the great work they have carried to a successful termination will certainly be held in appreciative remembrance by the people of the United States, and by the present and future generations of engineers throughout the world.

MEDIÆVAL CHURCH PLANNING IN ENGLAND.—V.

By FRANCIS BOND, HON.A.R.I.B.A.

Churches of the Premonstratensian or Black Canons.

THESE churches were served by colleges of priests living a common claustral life under a rule. Of the Canons Regulars they were the strictest and most ascetic. They seem to have resembled the Cistercian monks, except that they were priests, whereas the Cistercians, originally, at any rate, were nearly all laymen. Their churches also very frequently are Cistercian in plan, except that in England they seldom have an aisled nave. But that may simply be because they are on a smaller scale than those of the Cistercians. The great church of St. Martin, Laon, is aisled, and is thoroughly Cistercian in plan and elevation. The order was founded by St. Norbert in 1119 in a lonely valley called Prémontré, near Laon. Their first house in England was built in 1140 at Newhouse, in Lincolnshire; they had thirty-six houses in England. The abbot of Prémontré was abbot-general of the whole order; hence uniformity of plan. There were about thirty-four Premonstratensian houses at the Dissolution. As in the Cistercian churches, none but guests and servants were admitted to the services, and none of their churches were parochial. All they required, therefore, was a presbytery and two choirs, one for the canons and one for the servants or probationers.

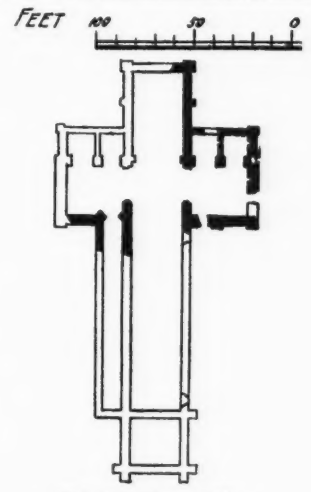


Fig. 25. *Torre Abbey.*

In the churches remaining in England the following seven have a rectangular unaisled eastern limb and transepts with rectangular chapels on the east of each arm, *e.g.*, Torre (Fig. 25). They frequently have chapels north or south, or on both sides of the western bays of the eastern limb, separated from it by solid walls more often than by an arcade. The eastern limb is usually much more elongated than in a Cistercian church, *e.g.*, at Easby (Fig. 26). When short, it is probably presbytery only. When elongated, it must sometimes have been both choir and presbytery, *e.g.*, at Dale the pulpitum, which closed in the choir stalls at the west, was beneath the eastern arch of the crossing.

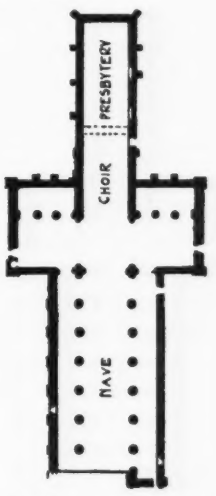


Fig. 26. *Easby Abbey.*

Easby, St. Agatha *juxta*, Richmond—*c.* 1180.
Shapp, or Hepp, Westmorland—*c.* 1200.
Blanchland, Northumberland—*c.* 1200—founded 1167.
Dale, Derbyshire—*c.* 1225.
Alnwick, Northumberland—founded 1147.
Eglestone, Durham—*c.* 1250.
Torre, Devon.

St. Radigund's, Bradsole, Kent, differs from the above in that the unaisled presbytery is so much elongated as to provide an eastern Lady Chapel. At *Hales Owen*, Salop, the eastern limb is said to contain an aisled choir and unaisled presbytery. Thus it resembles the group of churches to which belong Rochester Cathedral, *c.* 1200, and Southwell, *c.* 1233. At *West Langdon*, Kent, the eastern limb is an aisled parallelogram, as at York, Tintern, and Ely. The most important remains are those of *Bayham*, Sussex, where there was built just before 1200 a church of normal Cistercian plan, but with unaisled nave. To the east of this was added *c.* 1300 another Cistercian transept and presbytery.

Churches of Gilbertine Canons.

These were Canons Regular of an order founded by St. Gilbert, Rector of Sempringham, Lincolnshire, about 1139. It was a dual order. The nuns followed the Cistercian rule, and a house was attached for the chaplains who took the services in the church; these were practically Austin Canons. The canons' house and the nunnery were some distance apart, but there was one church for both, divided down the middle by a solid wall. A good deal of the nunnery survives at *Chicksand*, Bedford. At *Watton*, East Yorkshire, Mr. W. H. St. John Hope has excavated the foundations of the whole establishment; the church was an

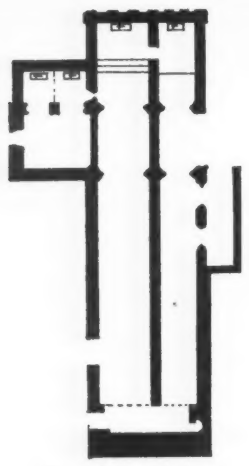


Fig. 27. Watton.

unaisled parallelogram without transepts; in addition, the canons had a chapel of their own (Fig. 27). St. Gilbert founded thirteen houses in his lifetime, of which ten were in Lincolnshire. There were about twenty-six Gilbertine houses at the dissolution. A considerable amount of the nave remains at *Old Malton*, Yorkshire.

Churches of Carthusian Monks.

This monastic order was founded in 1086 by St. Bruno at the Grand Chartreuse, near Grenoble. The name appears in England as Charterhouse, in Italy as Certosa. Of their houses the most magnificent was the famous Certosa, near Pavia. The first English house was founded in 1222 at Hinton, Somerset. At the Dissolution there were but eight houses of this order; none of their churches were parochial. The most extensive remains at those of Mount Grace Priory, where extensive excavations carried on under the direction of Mr. W. H. St. John Hope have revealed the general arrangement of the monastic buildings. At *Witham*, in Somerset,

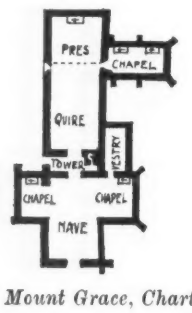


Fig. 28. *Mount Grace, Charterhouse.*

from which St. Hugh passed to the bishopric of Lincoln, the parish church is identified by Mr. Hope as the chapel of the Lay brothers; it is a vaulted aisleless church, with apsidal east end, 1176-1186. The church at *Mount Grace*, built soon after 1397, is planned like a Friars' church (Fig. 28), *i.e.*, the nave and presbytery are oblong and without aisles, and separated by a passage, in the centre of which was a central tower just as originally at St. Andrew's Hall, Norwich. Some remnants of the London Charterhouse exist.

The Carthusian order was a sort of reversion to the Grouped Hermitage system of pre-monastic days. Each monk dwelt in his own little house; there was little common life except as regards worship. The arrangement of their monasteries differs wholly from those of other monastic bodies. Of all the orders this was the most austere and ascetic, and of all the orders the most incorrupt.

Churches of the Austin (Augustinian) or Black Canons.

The Austin Canons, like the White Canons and the Gilbertines, were priests, and, like them, lived a claustral, common life. But they were less confined to the cloister than any other order of Canons Regular or monks, being allowed to serve parish churches belonging to their house. Thus the order is intermediate between the "religious" proper on the one hand, and the secular canons and parish priests on the other. Their rule or code was based on the writings of St. Augustine. Their first foundation in England was Holy Trinity, or Christ Church, Aldgate, London, founded in 1108. According to the monasticon, they possessed 218 churches. Four of their churches, in Carlisle, Bristol, Oxford, and Southwark, are now cathedrals.

Of their churches about 180 were purely conventual, and most of these have perished, *e.g.*, Blythburgh, Cirencester, Guisborough, Haughmond, Lilleshall, Llanthony, Newark (Surrey), Newstead (Notts), Oseney, Repton, Leicester, Thornton, Walsingham; some great churches, however, remain wholly or partly in use, *e.g.*, Bolton, Hexham, Lanercost, Thurgarton. Thirty-seven of their churches were both conventual and parochial, and have consequently for the most part survived, *e.g.*, Bourn, Bridlington, Cartmel, Dorchester, Dunstable, Edingdon, Christchurch, Hants, Waltham, Westacre, Worksop.*

Many of their establishments were on quite a small scale, and both choir and presbytery were accommodated in an unaisled eastern limb in parochial fashion, *e.g.*, at Bolton, Lilleshall, and Maxtoke. A more advanced plan, following perhaps Cistercian usage, constructs a short unaisled eastern limb to serve as presbytery, the choir being accommodated further west. The plan of Brinkburn, with its fine presbytery of three unaisled eastern bays, is almost as Cistercian as that of Kirkstall. Most of their smaller churches originally had aisleless naves, but frequently an aisle was added to that side of the nave where extension was not obstructed by the cloister, *e.g.*, Bolton.

Many of these last churches had a lateral chapel or lateral chapels, separated from the choir by solid walls. It was only necessary to substitute an open arcade or arcades for these solid walls to arrive at the more advanced and popular plan of the aisled choir and unaisled presbytery, which is seen in Oxford Cathedral, Lanercost, Llanthony, Cartmel, Newark, Repton, Dorchester, near Oxford.

The above three are the most characteristic plans of the churches of the Austin canons, except those of exceptional importance and size. When the establishment was on a large scale, the church frequently took the plan of the larger abbey churches or cathedrals. (1) At Bristol the present cathedral has aisled choir and presbytery, ambulatory containing lateral chapels, and projecting Lady Chapel. (2) At Portsmouth, Hexham, Kirkham, Thornton, Guisborough, Carlisle, the eastern limb is an aisled parallelogram, as at York Minster. (3) Southwark Cathedral and Hexham (1350) had the West of England plan, with external ambulatory and eastern chapels. (4) St. Bartholomew's, Smithfield, has the periapsidal plan of Gloucester and Norwich.

Churches of Secular Canons.

More ancient than any of the orders of monks or of Canons Regular were the colleges (*collegia*, *i.e.*, corporate bodies) of Secular canons. They differed from the monks in being priests, and both from monks and Canons Regular in that they did not live a claustral life. Nor did they, like the others, lead a communistic life; they had private property. In the eyes of the "religious," *i.e.*, the monks and Canons Regular, both the canons of collegiate and cathedral churches and the parish clergy were practically regarded as being of quite inferior status. Like the canons of the present-day collegiate churches, such as Westminster, Windsor, Canterbury, York, they lived among the laity, each man in his own house, not in a common cloister, dormitory, refectory. What has been said of the churches of the Austin canons is true, *mutatis mutandis*, of the collegiate churches of the Secular canons. Several were cathedral churches; a few others were of such importance as to adopt cathedral plans, *e.g.*, Dover Priory, Beverley, Ottery, Manchester, Ripon, Howden, Windsor. Few, however, seem to have adopted the plan which was so much in favour with the Austin canons, viz., an aisled choir and an unaisled presbytery; Wimborne and Southwell are the only important examples which survive.

But both the smaller plans of the Austin canons, viz., an unaisled eastern limb containing presbytery only or presbytery and choir as well, were frequently adopted in the smaller collegiate churches.

Churches of the Friars.

The various orders of friars did not appear till the XIIIth century. They differed from the monks in the fact that they did not live a cloistered, common life. They were itinerant, living anywhere where there was distress of soul or body, and travelling about freely. For their sustenance they relied on alms, and so were mendicants. They may be described briefly as itinerant mendicant monks. After a time, however, they came to possess corporate property, and their houses and churches vied in size and splendour with those of the monastic orders.

The Dominicans or Jacobins or Black Friars date from 1215; they arrived in England in 1221. The order was instituted by St. Dominic to oppose heresy, so they became known as Preaching Friars. The Franciscans or Grey Friars or Minoritis (*i.e.*, Little Brethren), date from 1210; they arrived in England in 1224. The order was instituted by St. Francis of Assisi. At first their work

* See Rev. J. F. Hodgson "On the Alleged Difference of Plan of Churches of Austin Canons and Monks," in the *Archæological Journal*, xli., 374; xlii., 96, 215, 331, 440; and xliii., 53, 290, 403.

was largely in the slums of the towns, but they soon became famous as preachers also; and the churches both of Dominicans and Franciscans were accordingly arranged so as to be one half preaching-house and the other half the private chapel of the Friars; the two parts being in England often separated by a passage, over which in the Dominican house at Norwich was a central tower.

Other orders were the Minoresses, Carmelites, and Austin Friars. The Minoresses were founded by St. Clare, a sister of St. Francis of Assisi, who had a house in the "Minories," near Aldgate. The Carmelites differed from the rest in adopting an eastern code, that of St. Basil. Several orders of friars were gathered together in 1265 under the name of Austin Friars. There were also other minor orders.

Churches of Dominicans or Black Friars.

At *Cardiff* the plan shows an unaisled eastern limb containing choir and presbytery and an aisled nave of four bays. At *Norwich*, St. Andrew's Hall, where the musical festivals are held, is the ancient Dominican church. It consists of an

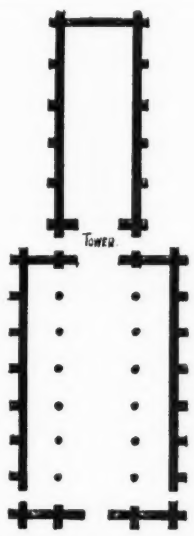


Fig. 29. Norwich. Black Friars' Church.

unaisled eastern limb, 100 ft. by 32 ft., containing choir and presbytery; aisled nave of seven bays, with passage east of it formerly surmounted by a hexagonal central tower; built between 1440 and 1470. *Bristol*, *Gloucester*, and *King's Langley*, Herts, possess fragments of Black Friars' churches.*

Churches of Franciscans or Grey Friars.

London.—Grey Friars, where till recently was Christ's Hospital, probably consisted of two aisled parallelograms separated by a passage, as in the Black Friars' Church. Norwich, with six bays in the nave and seven in the choir. *Winchelsea.*—Unaisled parallelogram with eastern apse. *Chichester.*—The "Guild Hall" is the desecrated choir of the Franciscan church. At *Gloucester* the choir is left; at *Richmond* and *King's Lynn* the tower; at *Denney*, Cambridge, are remains of the house of the Minoresses of St. Clare. At *Walsingham*, Norfolk, are extensive fragments of the house; the church has disappeared.

Fig. 30. Hulne.

Churches of Carmelite Friars.

The most important remains are at Hulne, near Alnwick, Northumberland, *c.* 1240. Both nave and eastern limb were oblong and without aisles, and were separated by a passage. At Aylesford, Lynn, and Gloucester also fragments of Carmelite churches survive.

Churches of Austin Friars.

Important remains of a church were excavated at *Ludlow*, Salop. The friary was founded between 1252 and 1282. The

Fig. 31. Ludlow. Austin Friars.

church consisted of a long unaisled eastern limb, and nave of six bays with north aisle. The nave was separated from the chancel by a passage containing the base of some octagonal building. In *London* the nave of Austin Friars is now the Dutch church in the City. At *Clare*, Suffolk, the church was a long aisleless parallelogram. At *Rye*, Sussex, the friars' church is now a Salvation Army barrack.

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Bath, November, 1894; Bayham, July, 1897; Bolton, May, 1895; Boxgrove, April, 1900; Buildwas, October, 1900; Byland, October, 1896; Cartmel, October, 1899; Dorchester, January, 1900; Dore, April, 1896; Glastonbury, August, 1894; Hexham, April, 1899; Lanercost, October, 1898; Lindisfarne, June, 1895; Llanthony, January, 1899; Malvern, January, 1897; Milton, January, 1901; Netley, April, 1895; Pershore, October, 1897; Rievaulx, July, 1894; Romsey, October, 1895; Selby, July, 1896; Sherborne, April, 1897; Tewkesbury, December, 1894; Tintern, July, 1898; Tynemouth, February, 1895; Valle Crucis, July, 1899; Westminster. January, 1894; Whitby, October, 1894.

The rest are tabulated below:—

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I am indebted to Mr. W. H. St. John Hope for valuable suggestions and criticisms and for the plans of Fountains, Rochester, Kirkstall, Torre, Watton, Mount Grace, and Hulne; to Mr. Harold Brakspear for those of Waverley; to Mr. John Bilson for that of St. Mary, York; to the proprietors of the *Builder* for the plans of Bolton and Cartmel; to the Society of Antiquaries for the plan of Ludlow, Austin Friars; and to Messrs. Batsford for permission to reproduce the plans of Gloucester, Winchester, Durham, Romsey, Dore, Salisbury, York Minster, Beverley, Kirkstall, from "Gothic Architecture in England." It should be added that for the position assigned to altars in the plans in many cases no evidence exists. All the plans have been drawn to a uniform scale by Mr. Allan Millar.

NOTES.

Government Contracts and Trades Unionism.

THE Trades Union Congress is to open at Bath on September 2. According to the *Times*, Mr. Steadman, the Secretary of the Parliamentary Committee, states that the Government Departments have come to an arrangement to give the Congress officials information as to the various contracts being entered into which enables the various trades unions concerned to be communicated with, a course which Mr. Steadman stated would make it easy to get an "unfair house" struck off the list of Government contractors. It is, of course, well known that the present Government favours trades unionism, but it seems hardly credible that the Government should play into the hands of the unions in the manner indicated in the above statement. Certain sections of the Socialists consider that any competition in labour is wrong, and the idea is to attain a dead level of wages, but as long as competition exists in trade at all, and foreign competition is a force to be reckoned with, it is difficult to see how labour is to stand outside competitive conditions. Notice to the unions of the contracts which are being put out to tender may strike the taxpayers as a curious system of obtaining tenders in the open market.

Railway Accidents.

THE Board of Trade has recently issued the annual report on railway accidents. It is somewhat remarkable that the year

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* On the churches of the Black Friars see C. A. Buckley in "Ecclesiology," extracted from the *Gentleman's Magazine*, pp. 294-307.

1906, like its predecessor 1905, was marked by a considerable increase in the deaths of passengers in railway accidents, and that whilst in 1905 thirty-nine deaths resulted, thirty-eight of which were occasioned by four serious accidents, in 1906, out of a total of fifty-eight deaths, three notable accidents accounted for fifty-six of them. The year 1889 has to be referred to to find an equivalent number of passengers killed in railway accidents. The total number of persons killed and injured by accidents due to the running of trains or the movement of railway vehicles was respectively 1,169 and 7,212; these figures compare with 1,099 and 6,459 in 1905, whilst the average figures for the past ten years are 1,144 and 6,631. As regards railway servants, the proportion of casualties to men employed was 1 in 71, the ten years' average being 1 in 70. In 1905 the proportion was 1 in 81. The Report, however, suggests that the improved system of reporting may account for an increase in the statistics of the numbers injured. The thirty years averages up to 1905 show that one passenger is killed in every 40,488,487 journeys, and one injured in every 1,224,545 journeys. These figures will suggest a comparison with the new form of locomotion—motor-cars. Whilst the railways are under strict supervision and have to make returns, and accidents are investigated by an expert tribunal, no compulsory returns are required by those using the public roads for fast traffic. Official returns would show a marked difference between the risks private individuals are willing both to incur themselves and impose upon others, and risks permitted to companies under statutory control.

Motor Traffic and the Roads.

THE Report of the County Surveyor for Kent on road maintenance draws attention to the heavy charges imposed on the ratepayers by reason of the motor traffic. The Surveyor estimates that at least 10,000*l.* out of a total of some 76,000*l.* expended on the roads is solely due to motor traffic, and that this expenditure will increase, as, owing to the high speeds attained in the open country and the steel studded bands in use on the wheels of the cars, nothing short of tarred macadam will suffice on main roads. It is suggested that the counties surrounding London should join in a deputation to the President of the Local Government Board with a view to bringing the matter of expenditure to his notice. It is obvious that these counties have to maintain roads for a traffic which is not strictly their own, but the heavy expenditure is not the only grievance to that large majority of the ratepayers who are not motorists. The motors, besides rendering the roads less safe for ordinary use, have caused all property near the roads to depreciate in value, and the tarred macadam is very prejudicial to the feet and legs of horses, and in certain conditions is so slippery that horse traffic has to be conducted at a foot's pace. The ratepayers may well ask themselves why they should be rated to convert the roads into motor tracks in addition to the inconveniences they already have to endure. Horses should still be considered, and the better the road is made for motors the greater is the speed attained by them.

The Eisteddfod Collapse.

IN spite of the warnings given by previous failures of timber stands, pavilions, and floors under exceptionally dense crowds, it does not seem to have occurred to any of the public authorities at Swansea that inquiry into the weight-bearing capacity of the Victoria Park pavilion should have been made before the meeting of the Welsh National Eisteddfod. What actually happened on the occasion to which we refer was that, owing to the weight of the crowd standing at the back of the pavilion, a large section of the floor collapsed and some hundreds of people fell with it to the ground, the distance most fortunately being only from 5 ft. to 8 ft. From published accounts of the mishap it appears that the cause was inadequate strength of the supports beneath the floor. There is really no excuse for an accident of the kind in the present day, when reliable data are available as to the strength of materials and the weight of crowds. As no fatal injuries were sustained by the audience the occurrence will not form the subject of a public inquiry, but we hope that those who were to blame in the matter will be suitably dealt with by the local authorities.

New Electric Lamps.

THE paper on "Developments in Electric Incandescent Lamps" which Mr. L. Gaster read at the recent meeting of the British Association will be of interest to all users of the electric light. He gives a clear description of many of the new forms of metallic filament and vacuum tube lamps now on the market. In our opinion, the most important lamp is the "osram" lamp, a description and appreciation of which we gave a year ago. Its life is nearly as long as that of the carbon filament lamp, and it gives at least three times the light for the same consumption of current. Unfortunately osram lamps of low candle-power are not yet made, the smallest unit being thirty candle-power. They can be used singly on ordinary 100-volt circuits, and two in series on 200-volt circuits. Mr. Gaster gives an interesting account of several other metallic filament lamps, the efficiency of which approaches that of the osram, and there is already a keen rivalry between the manufacturers of different types of these lamps. In America the advent of these high candle-power lamps has stimulated the scientific study of the best methods of illumination, and novel kinds of diffusing globes and screens are extensively used. Progress is also being made in the use of the "vacuum" tube method of lighting. In London two installations have been erected, one outside the Savoy Hotel and another at Salisbury House. In the Savoy installation a Moore tube, containing nitrogen gas and 176 ft. long, produces a brilliant yellow light, and consumes about three units per hour. The tube used in the Salisbury House illumination is 85 ft. long and contains carbonic acid gas. Mr. Moore claims that the white light produced by this tube is the nearest approach to daylight yet attained, and that colours can be accurately matched by means of it. That this test is a severe one can easily be verified by matching several coloured ribbons by the light of ordinary glow lamps, and then comparing them in daylight. The contrast of the effects produced in the two cases is very marked.

Clay in Cement Mortar.

WHILE some experimental results appear to show that in certain kinds of sand the presence of clay in proportions up to about 12 per cent. tends to increase both the compressive and tensile strength of cement mortar in which such sand is employed, it would be unwise to accept determinations of the kind as a general guide in actual practice. If the sand is perfectly dried as in laboratory tests, and if the clay admixed with the sand is also quite dry and finely powdered, a more intimate mixture can be made than that possible in cases where the materials are moist, and it is quite reasonable to infer that a small proportionate addition of clay, sufficient with the cement to fill all voids in the sand, may have the effect of increasing the compressive resistance of the resulting mortar. But if clay occurs naturally in association with sand in the form of lumps, no ordinary treatment will break up and distribute the material uniformly among the sand voids, and consequently weak spots will necessarily be found in the mortar or concrete made with such materials. Again, assuming the grains of sand to be coated with clay, it is certain that the cement will not be able to bond with the sand in an effective manner, unless plenty of water is used in the mortar, and very thorough working is practised, so as to separate the clay from the particles of sand. Another point that must not be overlooked is the physical condition of the clay. If any considerable proportion of it is in the colloidal state there will most probably be serious interference with the bonding of the cement and sand, and with the setting of the cement. One very cogent reason for looking with suspicion upon the presence of earthy matter in sand is that it very frequently consists largely of fine vegetable substances quite unfit for mortar, and a certain source of weakness.

New Concrete Steel Bridge at Pontypridd.

LIKE the town of Ironbridge, the village which has since grown into the busy industrial centre of Pontypridd, formerly known as Newbridge, took its name from an XVIIIth century highway bridge. The Pont-y-tu-prydd across the River Taff was built by William Edwards, a country mason, in 1750, and consists of a stone arch of 140 ft. span with pierced spandrils, a form of design suggested by the failure of a previous structure owing to the excessive weight of the haunches which forced up the slender crown of the arch. The new bridge, whose construction was commenced last month, has been designed entirely in concrete-steel on the Mouchel-Hennebique system, and will include concrete abutments, two river piers and three arched spans, one of 116 ft. and two of 25 ft. This bridge is noteworthy for the fact that it will represent the longest span concrete-steel arch hitherto built in this country, the most important example of the same kind now being

Stanford Bridge, with the clear span of 98 ft. 6 in. between abutments.

Hell Gate Bridge, New York.

SINCE the publication of our previous "Note" on this subject, we learn with satisfaction that the plans have been disapproved by the Art Commission of New York City. The main feature of the bridge was a 1,000 ft. span steel arch, with two pairs of pylons at each end, and apparently intended to give—but not actually giving—the impression of abutments. As we then suggested might be the case, the Art Commissioners do not approve the pylons at all. The Committee to whom the plans were referred say in their Report that the attempt to give decoration to the towers has not been satisfactory from an artistic point of view, and they recommend rejection of the plans without prejudice to their resubmission with more suitable treatment of the masonry details. The real fact is that the towers are completely out of scale with the steel-work, and instead of being treated decoratively, should have been plain masses of rusticated masonry: anything in the way of architecturally treated towers would be absolutely crushed in effect by the immense steel arched girders. It is satisfactory to find that proper attention is being devoted in New York to the æsthetic design of public works, and we hope that the example will not be lost on municipal authorities in this country, and especially on those responsible for the construction of new bridges across the Thames in London.

Air of the New York Subway.

IN our "Note" of July 13 we mentioned that the result of investigations into the physiological effects of the air in the New York subway would shortly be made public. The results in question have since been set forth in the report presented by Mr. George A. Soper to the Board of Rapid Transit Commissioners, and in a paper printed in a recent issue of *Technology Quarterly*. The average weight of dust in the air of the subway is stated at 61·6 milligrammes per 1,000 cubic feet. When examined under the microscope samples of the dust were found to consist of various substances, including an average proportion of 61·3 per cent. of iron particles, chiefly coming from wear of the brake shoes, and partly from the rails. It is calculated by Mr. Soper that brake shoes are ground up at the rate of one ton per mile of the subway every month. The condition of the throats and lungs of the employees received most careful attention, and autopsies were performed upon the bodies of six men who were killed in the subway during the year 1906. Briefly summarised, the conclusions drawn by the author are that the air of the subway is not injurious, its most objectionable feature being the iron dust, which so far as indicated by the recent inquiry does not seem to have been productive of evil consequences. We must point out, however, that Mr. Soper recommends thorough physical examination of the respiratory organs and heart of all employees when first engaged and at yearly intervals afterwards, this proposal suggesting that, while the subway air may not seriously affect persons in good physical condition, it may be prejudicial to those suffering from or having a tendency to disease of the respiratory organs.

BIRKENHEAD LIBRARY COMPETITION.

THIS competition was a local one, being limited to architects living in the borough, or firms having one partner there, and the assessor was Mr. Charles Heathcote, F.R.I.B.A., of Manchester. The result demonstrates the extreme wisdom of Mr. Lever, who offered to present a site (a much better and more central one), if the Library Committee would spend the whole of the 15,000*l.* given by Mr. Carnegie on the library building. In the opinion of the committee, however, 3,000*l.* were needed for equipping the new library, and one or two attempts were made to raise this sum—one cannot help but think rather lukewarmly—for such a paltry sum should have been got together by some means or other; but eventually the committee decided to spend no more than 13,000*l.* on the building, and to refuse Mr. Lever's offer. The present squalid site already belonged to the Corporation, and architects were accordingly invited to send in designs for a library which should cost 13,000*l.*, a sum quite inadequate considering the accommodation required. The assessor, in placing the design by Messrs. W. E. Sproat & E. Warwick first, has evidently felt that this question of cost has cramped the architects, for on plan it contains the areas asked for, but in order to keep down the cube the section and elevation have been starved. The reading-room, a vast room, 25 ft. by 89 ft., is only 13 ft. high, and the lecture-room only 15 ft. to the crown of the coved ceiling—surely a pitiable height; and the elevation is low and squat, and the scale small and without that dignity and largeness which one expects to find in a library. As an instance of this, the windows to the ground floor reading-room and magazine-room are 14 ft. wide and only about 8 ft. high, with nothing but a narrow stone architrave to carry over this huge span.

The site is an irregular one, the two main streets, Chester-street and Market-place South, making an obtuse angle, and the building, instead of coming on the angle of these streets (as is erroneously shown on the perspective of the successful design), is set back some 40 ft. from Chester-street, and this set-back has rendered a corner entrance decidedly *not* a *sine quâ non*. However, Messrs. Sproat & Warwick's scheme has a corner entrance, and the plan works exceedingly well, though 25 ft. seems narrow for a room 89 ft. long; the two main wings are set at right angles to each other, and do not follow the angle of the streets. We note that the authors of this design have departed from the conditions in making the magazine and news rooms open off the borrowers' space instead of an independent lobby, and we cannot agree with the placing of the children's room in the basement. But, taking it all round, from an economical point of view, this is undoubtedly a sound working plan. It is not so easy to see what has actuated the placing of the second and third designs (Messrs. T. T. Rees & Rimington and Mr. C. E. Deacon)—unless it be that of sheer economy. Messrs. Rees & Rimington's scheme, which has also a corner entrance, follows the obtuse angles of Chester-street and Market-place South, which gives an awkward sprawling back elevation and an extravagant-looking plan. The main entrance is ill-contrived, and consists of two small irregular vestibules opening one out of the other, mazed with doors. A spurious scale is given to the exterior on perspective by the figures which stand at the entrance; these are made 3 ft. 6 in. high—the detail of this entrance, in fact, is fussy, overdone, and niggling. The side wings, however, are much better.

Mr. C. E. Deacon's plan is square, with the entrance in the middle of the Market-place South front, but it is one of the worst plans of this type submitted, the rooms being oddly shaped and there are a superabundance of staircases. The exterior is in a strange kind of classic.

The most strange feature of the award was the rather cryptic remark made by the assessor on the scheme submitted by Mr. Edmund Kirby, F.R.I.B.A. "Upon examination of this design," he reported, "he believed they (the committee) would conclude that it would have been the one for a building of the sort they contemplated"; but it was rejected on the score of cost. On looking into it, however, it does not appear to be so very extravagant. The plan is certainly economical, on the same lines as the third premiated, but very much better in every way. The only extravagance is on the Market-place South front, where there is a dome and some figure sculpture, including a pierced coat of arms and supporters, which latter, in our opinion, might have been spared without detriment to the design. It is certainly very much more monumental than the winning design, and if the assessor was convinced that this design was what the committee wanted, we think that he might have given the architect a chance of getting in an estimate within the 5 per cent. margin allowed; for if he failed to do so, the work could be handed on to the next placed, and at most it would mean the delay of a few weeks, which would be nothing to risk if thereby they might get what the assessor described as "a beautiful plan and a lovely building."

In the exhibition of these drawings, which is open from Monday, 26th, to Saturday, 31st inst., there are also exhibited the designs for the branch libraries, also the gift of Mr. Carnegie. These were not put up for competition, but were given, the North Branch to Mr. A. W. Street, and the South Branch to Mr. J. R. Mewton, and it is interesting to note the immediate falling-off in design when there is no competition.

BERWICK-ON-TWEED, AND THE NEW OFFICIAL GUIDE TO THE FORTIFICATIONS.

SINCE the alarm was sounded, and the danger promptly averted that threatened the destruction of part of the remains of the Plantagenet wall round Berwick-on-Tweed, the Historic Monuments Committee of that "County of the Borough and Town" has issued an official guide to the fortifications with explanatory diagrams, with a view to impress the freemen and other inhabitants with their interest and value. This has been written by Commander F. M. Norman, R.N., J.P., who is chairman of the committee. Without going into details of the events that caused Berwick to change owners thirteen times before the year 1482, Captain Norman shows us excellent presentments of the old border-town in different periods of its existence. He tells us that when Edward I. visited it for the first time the only fortification it possessed was the castle, and that warrior immediately increased the strength of it by the formation of a fosse, 80 ft. wide and 40 ft. deep, extending from it to the river. He is not certain that Edward built the first wall round the town, though deeming it likely he may have commenced it, contenting himself with mention of the fact that it was in existence before the close of the next reign (1307-1327). However, in the portion of the "Scala Cronica" recently translated by the Right Hon. Sir Herbert Maxwell there is a direct statement that may cancel this reserve. To explain. Five hundred and fifty years ago an ancestor of Lord Grey and of Sir Edward Grey was Warden of Norham Castle under Edward I., II., and III., successively. One day this Knight was made aware of a party of Scots ravaging the land close at hand. He gave chase, and fell into the hands of the Earl of March, who was in ambush awaiting him. He was taken to Edinburgh Castle and imprisoned there for two years. He was not thrown into a dungeon evidently, for he had access to the library, and his mind coming under the influence of the old writers in various languages—the troubadours, trouvères, French jongleurs, German minnesingers, and Italian rhyme-smiths (as the poets of that nationality were called), and their chronicles, romances, songs, odes, and legends—it came into his heart that he would also hand down a work to posterity, and it should be a history of Britain. Sir Herbert Maxwell, with the greatest care and exactness and much mediæval learning, has now translated the part of this work that relates

to the time in which Sir Thomas Gray lived, concerning which his information must be considered authentic. It is called "Scala Cronica," or ladder chronicle, which title associates it with the escalade which is the crest of the Grey family. Sir Herbert has dedicated his translation to a direct descendant of the scholarly knight, the Right Hon. Sir Edward Grey, of Falloden. Among the multitude of facts set down in it —including word that there came a day when the Earl of March, in turn, was set upon "by some ruffians in Northumberland, and came near to be murdered"—there is a straightforward statement that Edward I. built a wall round Berwick.

This wall was 2½ miles in circumference, and varied from 15 ft. to 22 ft. in height. Captain Norman follows its course and points out the sites of ten of the nineteen towers with which it was strengthened, the only one of which left standing was that so recently in danger of demolition. A plan, preserved in the British Museum, shows it was crenallated and surrounded the whole town. Of this mighty mass of martial stonework, only 50 yds. or 60 yds. and the tower mentioned are now standing, besides a few fragments here and there. The Castle, too, has disappeared, all but forlorn scattered fragments of walling; and the platform of the railway-station occupies the site of the great hall in which Edward I., in all the pomp and circumstance of his suzerainty, sat to judge the rights of the contesting claimants to the Scottish crown.

When Queen Elizabeth came to the throne Scotland was a potent power; and consequently Berwick was looked upon as a place of much importance. The Queen is said to have called it "the very key to her realm." The great circle of Plantagenet masonry, then more than two centuries old, was in decay, as was the Castle, and not capable of resisting artillery, and an order was issued for a new wall. This is still ours, very strong, silver-grey, ash-grey, and dove-grey in parts according to its aspect, 12 ft. thick at the base, and 10 ft. nearer the summit, and backed up with earth to a great thickness. On the top of it is a wide walk, from which the Tweed, the sea, and the surrounding country, with the hill from which Mary Queen of Scots, among others, looked down upon it, can be seen. Outside of it was a moat 200 ft. wide, in the centre of which was a deeper ditch 12 ft. wide; and there were four gateways, three of which are still standing. As a fortification it was a novelty at the time of its erection, for it was built after the Italian manner with bastions and semi bastions, instead of being merely a curtain with towers at intervals. It is usual to ascribe this kind of circumvallation to Vauban, who, however, as Captain Norman points out, was not born till later than the day that saw it completed. There was a very considerable diminution of the area encompassed by the new wall, and the stones of the old one were freely used for it. Mention must be made of a peculiar feature in the bastions. Instead of the contour falling back from the shoulders of each into the curtain, there is a recess along this length on both sides called a flanker. Defenders in these flankers could prevent the approach of besiegers to the curtain, which was generally chosen for assault. In one that has been explored (for in the course of the years after the Union of the two kingdoms they have been filled with soil and turned into gardens) it has been ascertained they were entered from the area within the wall by a tunnel of stone or brick. Inside are two stone platforms for guns, with shelter for gunners, and there is also at the innermost end a small chamber reached by a winding stair, the access to which is through a porthole, which was probably a lookout from which orders could be issued. Captain Norman notices these flankers, particularly, are lined with ashlars from the Edwardian wall. The Elizabethan masons used the abundant limestone of the adjoining coast for the facing of their work, and filled it in with Edwardian stones and others from the shore. For one short distance near the river they followed the line of the first wall, notwithstanding the general reduction in its extent. Cavaliers were eventually added to the bastions, by which means a greater range was secured for the guns; and there were also casemates, one of which was two-storied. The genial guide takes his readers round this superb relic of Elizabethan times with the same care he has bestowed upon traces of the first wall. One diagram, furnished by the borough surveyor, Mr. R. Dickenson, shows the two circumvallations with their relative positions one within the other, and the length where they corresponded for a short distance. Modern buildings conceal some items of interest, and many ancient ones have been removed that would be a gain still to possess. But few old houses remain in the town. One near the Cumberland bastion has the date 1589 upon it, and another in Church-street, dated 1601, has an inscription:—"Fear to ofend or mark thend." All the ancient churches, monasteries, and hospitals have been effaced. The fine bridge over the Tweed, built when the Scottish King came to the English throne, still spans the river, and is claimed to be the only Imperial one in the kingdom, belonging neither to the county or the town, but to the Crown. There have not been wanting antiquaries who have claimed for the Castle that it was the Garde Joyeuse of King Arthur's days, notwithstanding Malory's explicit statement that some men said that fortress was Bamboro', and some men said it was Alnwick. Be that as it may, it is sufficient for us to accompany Captain Norman round the site of the Plantagenet wall and along the promenade on the summit of that of Queen Elizabeth, and take notice of all else he points out—the barracks (the oldest in England) now occupied by the King's Own Scottish Borderers; the pier jutting into the sea for nearly a thousand yards; the lighthouse; the new border-bridge opened by Queen Victoria; the parallelogramic church of Post-Reformation days, whereof the bells are those that also belong to the town-hall; the three old gateways, with their heraldry; the old place of execution in use till 1825 on Gallows hill; the principal streets; the Palace green; the cat-well, and a hiding-place used by smugglers in the last century.

There is an illustration of the Berwick seal in this guide, which is redolent of the romance and chivalry of its day. There are two shields on it displaying the arms of the King of England quartered with those of France. Between them is the badge of the town, a bear collared and chained, and above this is a seated figure carrying an orb, and in the act of pronouncing a blessing. The legend simply says it is the seal of the mayoralty of the town of Berwick-upon-Tweed. When we call to mind Edward II. issued a proclamation at Berwick of the loss of his privy seal, we can realise the importance of such an item, and the part it played in the events of the day. Looking back upon the events themselves, the marching and encamping of great armies, the terrible encounters, the long sieges, the landing of surprise parties with their escalades, the hanging of hostages, the imprisonment of the Countess of Buchan, the quartering of such intrepid warriors as Wallace, we feel the walls have borne a part that entitles them to all the consideration the official guide claims for them. We must congratulate the authorities of the Berwick Historic Monuments Committee on having such a capable and discriminating exponent of their views as Captain Norman, and compliment him upon the arresting manner he has executed his pleasant task. As donations are required for further explorations, it may be mentioned that County Alderman Thomas Darling, J.P., is the Hon. Secretary, and Mr. Wm. Madden, the Hon. Treasurer, both residents in the border town. The Edwardian remains are the property of the freemen, except a short length in private hands. The Elizabethan works belong in part to the sanitary authority and in part to the Crown as represented by H.M. Office of Works. The last-mentioned has recently secured a lease of a section of the Edwardian fosse from the Corporation to ensure its preservation.

LINOLEUM WORKS, KIRKCALDY.—The Dean of Guild Court have passed plans for the erection of a linoleum factory at Pathhead, Kirkcaldy, for the Fife Linoleum Company (Ltd.). The factory is to be built of brick, with redstone dressings, and is to be four stories high, while the main chimney stalk will be about 180 ft. in height. Messrs. J. D. Swanston & Syme, Kirkcaldy, are the architects.

METROPOLITAN WATER BOARD (CHARGES, ETC.) BILL.

THE Royal Assent was given to this Bill on Wednesday, and it will come into operation on April 1, 1908. The clause relating to supply for building purposes as finally passed reads as follows:—"Any builder being about to erect any building or part of a building who shall require a supply of water for that purpose shall be deemed to be the occupier of premises within the meaning and for the purposes of the section of this Act relating to 'supply by measure.' Provided that if the Board so determine they may, instead of affording the required supply by measure, afford the same at a rate not exceeding 7s. per 100*l.* of the probable total cost, after making such allowance as the Board may think reasonable for decorative or iron or steel work not requiring the use of water." The clause "supply by measure," as finally passed, reads thus:—"The Board shall, at the request of any owner or occupier of any premises situate in or adjoining any street in which any main or service pipe of the Board is or shall be laid, who requires for use on such premises a supply of water by measure for purposes other than domestic, and by means of communication pipes and other necessary and proper apparatus, to be provided, laid, and maintained by, and at the cost of, the person requiring such supply, afford a supply of water by means of a meter or other fit and sufficient instrument or apparatus supplied (at the cost of such person as aforesaid) or approved by the Board for measuring and ascertaining the quantity of water so supplied. (2) The Board shall charge for any supply furnished by them under the last preceding subsection of this section not exceeding the following rates for every 1,000 gallons (that is to say):—When the quarterly consumption of water does not exceed 50,000 gallons, 11d.; when exceeding 50,000 gallons and not exceeding 100,000 gallons, 10d.; when exceeding 100,000 gallons and not exceeding 200,000 gallons, 9½d.; when exceeding 200,000 gallons and not exceeding 500,000 gallons, 9d.; when exceeding 500,000 gallons and not exceeding 1,000,000 gallons, 8½d.; when exceeding 1,000,000 gallons and not exceeding 3,000,000 gallons, 8d.; when exceeding 3,000,000 gallons and not exceeding 5,000,000 gallons, 7d.: when exceeding 5,000,000 gallons, 6½d. Provided that the Board shall be entitled to charge for any such supply a sum of not less than 22s. 11d. in any quarter of a year, and shall not be required to furnish any such supply for hydraulic power or in any greater quantity than 500,000 gallons in any day of twenty-four hours, save to such consumers as may have, during any day in the year ending March 31, 1907, received a supply in excess of 500,000 gallons, in which case the Board shall, if required, continue to give to such consumer a daily supply not exceeding the quantity so received. Provided, also, that the whole of the water taken within any railway premises which form one area for railway purposes and are connected otherwise than by the running lines of the railway company, shall be reckoned as one supply, and chargeable accordingly, notwithstanding that the water may in fact be delivered thereat through two or more meters, pipes, or other necessary and proper instruments. Provided, further, that the whole of the water furnished to any person within any premises which form one area for trading or manufacturing purposes shall be reckoned as one supply, and chargeable accordingly, notwithstanding that the water may in fact be delivered thereat through two or more meters, pipes, or other necessary and proper instruments. Provided, also, that the provisions of this section shall not prejudice any right which the London Hydraulic Power Company may have under this section to require a supply for the purposes of their trade or business. (3) The said rates shall be charged uniformly under like circumstances to all consumers entitled to and receiving a supply under this section, and the Board shall not, in the case of any supply exceeding 25,000 gallons, charge for any such supply a greater sum than they would be entitled to charge if the quantity of water supplied were just sufficient to bring such supply within the next division of the above-mentioned scale of rates, relating to a supply of a greater quantity whereon a lower rate for every 1,000

gallons is chargeable. (4) The Board shall not be liable to any penalty or damages for not supplying water under this section, if the failure to furnish such supply arises from frost, unusual drought, or other unavoidable cause or accident."

MONUMENT TO JOHN KAY.

JOHN KAY was born in 1704, in the town of Bury, Lancashire, also the birthplace of Sir Robert Peel. By his mechanical inventions he is considered to have largely contributed to the foundation of the cotton-weaving industry in the county; but, having met with much opposition from the hand-loom weavers of the period, who feared their trade might be injured by the introduction of machinery, he was ultimately obliged to seek refuge in France, where he died in obscurity at a place and date not now known.

A tardy movement has now been made to commemorate his work by his fellow townsmen, who propose to erect a monument to his memory in the principal open space of the town, in accordance with the design now illustrated. The entire cost of the scheme will be borne by Mr. H. Whitehead Eyre, D.L., of Bury, late High Sheriff of the county, who is a descendant from a branch of the Kay family.

The steps, base, and shafts will be of granite, the remainder of the structure of Portland stone. The figures and panels will be of bronze, modelled by Mr. J. Cassidy, of Manchester. The figure on the summit of the dome represents fame. Those on the pediments agriculture, engineering, weaving,

MONUMENT : TO : JOHN : KAY : TO : BE : ERECTED : AT : BURY : LANCS.RE

and mining industries carried on in the county.

The pediments will contain carved coats of arms of towns and localities associated with John Kay.

Beneath will be a portrait medallion with inscription and bas-reliefs representing the progress of the art of weaving, all in bronze. The architect is Mr. W. V. Gough, of Bristol.

Builders' and Contractors' Column.

Slag in Reinforced Concrete.

Experience during the last twenty years has shown that concrete in sea water is particularly liable to disintegration owing to the action of soluble sulphates on lime that has become free during the process of setting, and on the ferrate, aluminate, and silicate of lime contained in the cement. In a paper contributed to the *Proceedings* of the Institution of Civil Engineers, Dr. Michaelis of Berlin proposed the addition of pozzualana to cement used in sea water—a material capable of forming stable compounds with any excess of lime, or of lime set free during the hardening process. The object of this treatment is to convert the lime to a useful purpose, and so prevent it from being affected by sulphates in solution.

The precaution usually taken against sulphur by marine engineers is to make the concrete impermeable so as to prevent the sea water from gaining access to the interior of the structures in which concrete is employed.

Engineers who know from experience how necessary it is to exclude compounds of sulphur from concrete are careful not to employ aggregates containing that element in any form, but from the continued use of slag and clinker in building practice, we are justified in assuming that many architects do not recognise the undesirable character often exhibited by such aggregates.

A belief too commonly entertained is that all furnace slags are inert materials having the composition and permanent nature of glass, and a fact too frequently overlooked is that many varieties contain sulphur in considerable proportions.

It will be seen, by the analyses given in Tables I. and II., that some acid-process steelworks slags are free from sulphur, and contain a comparatively small proportion of compounds liable to hydration. On the other hand, basic slags invariably contain sulphur and oxides of the alkaline earths, frequently in excessive quantities.

Not only does slag differ in composition in accordance with the locality and the nature of the process in which it is produced, but its composition varies from time to time, and in the slag supplied from a given source it is easy to pick out several samples of quite different character and diversified colour, some of glassy appearance, others with the texture of fine stone, others of coarser grain and encrusted with alkaline matter, and others again, porous and friable throughout.

Apart from the variations of chemical composition represented by differences of colour, it is quite clear that specimens such as some of those mentioned above are absolutely unsuitable for use as aggregate, owing to their friability and evidently unstable nature.

The analyses in Tables I. and II. are sufficient to show at a glance the superiority of steelworks acid slag, and if such material can be obtained of reasonably uniform and permanent character, there is little or no objection to its use. The large percentage of silica and the small percentages of lime and magnesia afford satisfactory guarantees of strength and durability, and the absence of sulphur removes any apprehension that might otherwise exist as to injurious action upon the cement and steel.

With regard to blast furnace and steelworks basic slag, the comparatively small percentage of silica, and the large proportion of lime always present, furnish justification for the fear that when these products are used in concrete partial disintegration will take place, accompanied by hydration of the lime and chemical reaction between sulphur in the slag and cement in the mortar.

It is now admitted by engineers that sulphur in excess of about 0·7 per cent. is distinctly injurious to Portland cement itself, and by the British Standard Specification the proportion is limited to less than 0·5 per cent., representing 2 per cent. of calcium sulphate. The presence of sulphates, and sulphur compounds generally, in cement slurry is highly objectionable owing to the formation in the kiln of calcium sulphide which is an active enemy of Portland cement, probably owing to the fact that it is apt to attack and decompose iron compounds occurring therein. It must be remembered also that a given proportion of sulphur added to the finished product is far more prejudicial than an equal quantity in the raw materials of cement, and burned with them in the kiln. As the sulphur found in blast-furnace slag exists in the form of sulphide, there is obviously reason for anticipating trouble in concrete made with ordinary blast-furnace slag containing any considerable proportion of sulphur.

An even more important point is the action of sulphur upon the steel used as reinforcement in concrete-steel, where the metal is permanently hidden from sight so that the process of corrosion cannot be observed, and no warning can be given of future danger or of impending collapse.

One of the conclusions drawn by Messrs. Booth, Garrett, & Blair from a series of tests recently made for the Roebling Construction Company was that aggregate containing as little as 0·2 per cent. of sulphur would cause the corrosion of steel more or less rapidly according to the presence or absence of moisture. In view of this opinion, there is certainly reason to fear corrosion from slag containing quantities of calcium sulphide ranging from 2 per cent. to 4 per cent., and representing from five times to ten times the amount of sulphur present in the material tested by Messrs. Booth, Garrett, & Blair.

While admitting the suitability of some slags as aggregate for adoption in reinforced concrete, we must emphasise the fact that the indiscriminate and injudicious employment of such material is most unwise.

Table I.—Representative Analyses of Steelworks Slag.

—	Yorkshire Siemens Acid.	Glasgow Siemens Acid.	Siemens Acid.*	Siemens Basic.*
Silicon oxide	53·80	54·50	60·80	21·30
Aluminium oxide	—	3·30	2·21	1·92
Ferrous oxide	41·30	27·00	18·22	9·50
Ferric oxide	—	—	—	5·16
Manganous oxide	3·95	6·32	9·23	5·95
Calcium oxide	·75	6·50	5·01	37·50
Magnesium oxide	—	2·16	3·60	4·05
Sulphur	—	—	—	0·22

*H. Brearley and F. Ibbotson. "The Analysis of Steelworks Materials."

Table II.—Representative Analyses of Blast Furnace Slag.

Constituents.	Midlands.	Yorkshire.	Cleveland.	South Wales.	Glasgow.
Silicon oxide	31·32	34·00	43·07	37·00	30·20
Aluminium oxide	26·26	14·20	14·85	10·30	13·50
Ferrous oxide	·48	·50	2·53	—	·51
Ferric oxide	—	—	—	—	—
Manganous oxide	·86	3·20	1·87	1·20	1·49
Calcium oxide	38·48	43·60	23·92	47·30	45·71
Magnesium oxide	1·01	5·50	5·87	3·08	4·21
Sulphur	1·86	1·80	1·06	1·35	2·05

Miscellaneous.

The Wall Paper Manufacturers, Ltd., Anaglypta Branch, have just supplied a quantity of their relief ceilings for the interior decoration of some of the new railway carriages for one of the South American railways. In South Africa they have just booked an order for some thousands of yards and panels for dado work for the Transvaal.

The Improved Wood Pavement Company, Ltd., of Queen Victoria-street, E.C., are to lay their creosoted deal paving during this month and next in Charing Cross, Tooting High-street, Finchley-road, Lower Kennington-lane, Waterloo-road, Queen's-road, Bayswater, Charing Cross-road, Belgrave-road, Park-lane, Kensington-road, Knightsbridge, Westbourne-grove, Sussex-place, Tenison-street, Chandos-street, and Constitution Hill, a total area of over 100,000 sq. yds. The contract for the last-mentioned thoroughfare includes widening, redraining, making-up, concreting, and paving.

Competition.

Birkenhead Central Library.—At a special meeting of the Birkenhead Town Council on the 21st inst., Alderman J. T. Thompson moved the adoption of the recommendations of the Library Committee in connexion with the proposed Central Library. He said the assessor, Mr. C. Heathcote, had made his awards, the premiums going to the authors of designs "I," "M," and "V," in the order named. The design marked "I" had for its authors Messrs. W. E. Sproat and Eldon Warwick. The second was by Mr. T. T. Rees, and the third had been submitted by Mr. C. E. Deacon. Alluding to the conditions which attached to the competition, the speaker said Mr. Sproat resided in Liverpool, but his partner lived in Birkenhead, and as a resident of the borough he was fully qualified to compete. The committee had considered his firm eligible to take part in the competition, and to be accepted as the architects of the new Central Library. Mr. Heathcote reported that there were twenty-two designs submitted, all of which showed excellent work in regard to both the plans and elevations. But he regretted that paragraph 2 of the conditions had not been observed in many designs, and he had been compelled to leave them out of his consideration. It was for this reason that they were unable to accept the design marked "T." Upon examination of this last design, he believed they would conclude that it would have been the one for a building of the sort they contemplated. The assessor found, however, that the building could not be erected for anything like 15,000*l.*, which was the condition laid down in the second paragraph. The author of this design was Mr. Edmund Kirby. The resolution was unanimously agreed to.

Books.

Public Libraries. A Treatise on their Design, Construction, and Fittings, with a Chapter on the Principles of Planning, and a Summary of the Law. By Amian L. Champneys. (London: B. T. Batsford. 1907.)

In the preface to this book the author writes that "up to the present time there has been no book in the English language dealing at all comprehensively with the subject of public library architecture," and adds the hope that in issuing the book he is contributing something to the literature of the subject which has hitherto been wanting. We think that the hope is justified, but we are not quite sure that we can agree with the statement that this is the first book in the English language dealing at all comprehensively with public library architecture. Ten years ago a book on "Library Construction" was written

by Mr. F. J. Burgoyne, and, although the author was a librarian, the book contained a number of plans and a good deal of information, all of which were intended to be (and undoubtedly were) of service to architects. Indeed, in that volume the illustrations included a greater number of plans of libraries and a larger amount of text than are contained in Mr. Champneys' book. Of course, something has been learnt during the last ten years, and a new book on library architecture, written by an architect, is certain to be welcomed by other members of the profession.

After an introductory chapter, there is a short chapter on materials and construction. The third chapter deals with artificial lighting, heating apparatus, fire prevention, speaking tubes, lifts, etc., and contains a number of hints which will be useful to those who have already a preliminary knowledge of the subjects discussed. The next two chapters describe and illustrate different kinds of shelving, furniture, indicators, and other fittings specially adapted for use in public libraries, and nearly everything which the architect ought to know about these fittings can be learned from the two chapters. Dimensions are given in nearly every case, and the different methods of cataloguing and indicating are carefully described.

The author then proceeds to describe and illustrate the different rooms required in public libraries, one chapter being devoted to the storage of books, and the next to the lending department in its two forms, namely, the barrier system and the open access system; another chapter deals with the different kinds of reading-room, and this is followed by a chapter on the reference department. Entrances, staircases, lecture-rooms, and catalogue-rooms, etc., are then dealt with, and there is a short chapter on administrative accommodation. These chapters are perhaps the most useful in the whole book, as the arrangement adopted facilitates reference; an architect engaged in designing a library can in a few moments look up all the necessary information about each particular part of the building. For example, if he wishes to learn something about the librarian's room, he will find that an office surrounded by glass screens is not at all desirable, but that the room should be in a quiet part of the building, with access to the working spaces for the staff, rather than directly to the public rooms or vestibules; he may also be interested in learning that the room should contain, among other things, an office chair and desk, and a waste-paper basket.

After a chapter on "Finance, Organisation, and Building," for the financial part of which the author acknowledges his indebtedness to Mr. J. D. Brown's "Library Economy," there is an excellent chapter on the principles of public library design. It is divided into two parts, the first dealing with the disposition of the departments, and the second with the æsthetic treatment of the buildings. The last chapter is a sort of continuation of this, and contains examples of single libraries and of central and branch libraries. A list of the buildings shown in the illustrations will do more to reveal the scope of this part of the book than will a long description. The English examples are nine in number, namely, the Wakefield and Kingston Public Libraries, by Mr. Alfred Cox, F.R.I.B.A.; that at Kettering, by Messrs. Goddard & Son; the well-known library at Chelsea, by the late J. M. Brydon, F.R.I.B.A.; the central and north branch libraries at Islington, by Mr. H. T. Hare, F.R.I.B.A.; the second premiated design by Messrs. Trimnell & Davison, for the Hackney Central Library; and two branch libraries at Brockley and Lower Sydenham, by Mr. Albert L. Guy, F.R.I.B.A. There are also four examples of small American libraries, and photographic views of the large Boston Public Library, and of the Bibliothèque, St. Geneviève, at Paris. The examples are not very numerous, but the author has evidently taken pains to select only those which are meritorious both in plan and in architectural treatment, and in which different arrangements of the rooms were required to meet the peculiarities of different sites or the varying purposes for which the buildings were intended.

As to the æsthetic treatment of public libraries, we agree with the author that this is a matter of considerable importance. To quote his own words:—"In the first place, a building which is a work of art is in itself a powerful educational factor; in the second, a dignified structure commands respect for the work with which it is associated; while, lastly, an attractive exterior and pleasing interior are great inducements towards the use of the building." This is very well put, and may be commended to the notice of those who are responsible for the promotion of public libraries.

The Public Libraries Act (1892) and the Public Libraries Amendment Act (1903) are printed at the end of the volume.

A word of praise must be given to the printer and publisher for the excellent way in which the book has been produced, and thanks are also due for the index, although this would have been very much improved by the inclusion of the names of the architects whose designs are illustrated, and of the towns which own the libraries referred to in the text.

The Country Gentleman's Estate-Book: 1907. Edited by WILLIAM BROOMALL. (London: The Country Gentlemen's Association.)

THE above covers a great amount of different work; there is hardly any other business that requires such a diversity of knowledge, and anyone taking over the management of an estate must not only be well up in the work of arable and grass farming so as to be able to see that justice is done to the land, but must also have some knowledge of surveying and builders' work. "Take care of the buildings and the land will take care of itself." Few farmers take notice of the dilapidations on the homestead; they let doors hang on one hinge, or spouting get stopped up with nests and leaves till walls are saturated with wet; but how seldom will they take the trouble to get a ladder to put the matter right, and why? Because it is not damaging their property; if the door eventually comes off in a high wind, or walls crack, the agent is asked to come and see to it and repair. Now, fences he must keep in order, or his cattle would stray, and his land must be clean and in good condition, otherwise he would only get poor crops, so he naturally takes care of the land out of which he makes his money. We must therefore look after the building, and the most useful man to have on an estate is a carpenter that can repair and work up old material; a broken cow-house door will make a pigstye door, and a gate that most people would think only fit for a bonfire is often, if head and heel good, made new again by putting in a couple of bars at the cost of perhaps half-a-crown, whereas a new one would run into 14s. Then, again, a door drags, or frame comes loose, and if left to the tender mercies of the tenant would remain so till new door and frame is required, whereas, if notice is given to the estate carpenter, the evil could be remedied at once, and some pounds saved; but the carpenter's time should be charged to the tenant, as they then take more care, and by nearly all agreements the tenant ought to keep the premises in good order and repair.

Another reason for having an estate carpenter is that there are an increasing number of wood and corrugated iron buildings being put up, and these necessitate constant attention if they are to last many years; but in erecting your wooden building it is absolutely necessary to put a brick foundation, and three courses of brick above ground level, and, if well spouted and painted, will last a lifetime. Paint is, perhaps, too expensive, and tar is considered by many to make the wood brittle. Now, limewash is very cheap; any labourer can put it on, and it decidedly toughens wood; it can be dressed over every year, and most people prefer the look of a clean white shed with oxide roof to a black, funereal-looking building. What lights up the hills in Wales and the Isle of Man more than the whitewashed cottages? There is no doubt if, under a new Act of Parliament, county and parish councils have to take in hand the management of estates for small holders, the buildings will be mostly of wood, as they would not be able to afford to erect, or, rather, the holder would not be able to afford to pay rent for, expensive brick and slate cow-houses, stables, and pigsties; and how a Small Holding Act is to work in regard to repairs is not quite clear, as all land agents know from experience that farm buildings require constant looking over, and it would add very much to the expense of working the Act if each council has to keep a land agent. Every estate should retain 20 per cent. of the gross rental for upkeep, and many require a good deal more.

Reinforced Concrete. By LIEUT.-COLONEL J. WINN, late R.E. Professional Papers of the Corps of Royal Engineers. Fourth series, Vol. I.—Paper 5. (Royal Engineers' Institute, Chatham. 1907.)

THIS pamphlet contains the substance of a lecture delivered by the author at the School of Military Engineering, Chatham, in February last. We fully agree with the view expressed in his introduction by Colonel Winn that the very simple form in which the constituents of reinforced concrete are found and the ease with which they can be transported, adapt them specially to the use of the military engineer. It is encouraging, too, to learn that the employment of this material is on the increase in the Army, although the officers of the Royal Engineers have not taken it up as a general rule. After briefly stating the principles of beam, column, and arch design, the author gives a series of notes on "Materials," which appear to be based in the main upon the recommendations of the Joint Committee of the Royal Institute of British Architects. After a section entitled "Practical Details," we come to further notes on materials in the form of "Reinforcement." The suggestion that plain steel bars should be clean should not be taken to mean that they are to be free from a slight film of rust, for, as well known and emphasised at the recent Engineering Conference, it is an advantage to use bars that are slightly rusty. In the same connexion we may say that, while the application of Portland cement grout to the bars is good theoretically, it is unpractical, and the coating proposed would be very liable to be disturbed before the bars were finally bedded in place. Colonel Winn discusses the merits of three patented types of reinforcement, all of which certainly offer advantages; but since plain bars, procurable in the open market, have been used for many years past with perfect success in numerous patented systems, and by engineers designing structures on ordinary mechanical principles, it does not seem necessary as a general rule to complicate matters by the employment of patented bars that can only be bought from individual firms at a cost which Colonel Winn puts at 35 per cent. more than that of ordinary bars.

The pamphlet is illustrated by a series of plates containing a large number of drawings and photographic views of works already executed, and it is to be hoped that the publication of the lecture will prove useful to the officers as well as to the men of the Corps of Royal Engineers, and have the effect of encouraging the former to devote further attention to the method of construction therein discussed.

BOOK RECEIVED.

GUIDE TO SOME OF THE PUBLIC WORKS OF FRANKFORT-ON-THE-MAIN. Published by the City Engineer's Department, Frankfort. (Schirmer & Mahlan.)

Correspondence.

PUBLIC ELEMENTARY SCHOOLS.

SIR,—I regret I was unable to attend the International Congress on School Hygiene, being absent from London, but upon returning to town for a few days I have had the opportunity of perusing the report of the proceedings published in your issue of the 17th inst.

I think it advisable to point out by way of correction certain remarks in the speech by Mr. Topham Forest, presuming, of course, that he is correctly quoted. Mr. Forest states that "finally the late School Board for London built a school with classrooms for not more than eighty each, and with a separate teacher for each room, the large schoolroom or hall being used only for one class"—thus leaving the impression that eighty was the prevailing unit.

I should like to be supplied with the name of the school to which Mr. Forest refers, as I have had the honour of building all the

schools for the late School Board since 1884, and cannot recall such a case. On this subject I would refer Mr. Forest to the paper I read at the R.I.B.A. in 1899, and to the remarks of the Hon. E. L. Stanley (now Lord Stanley of Alderley) in the discussion.

In his remarks upon the propulsion system of ventilation Mr. Forest appears to establish an ideal that the air should be changed six times per hour. In the early days of the adoption of this system by the late School Board, six times per hour was perhaps considered sufficient, but in later cases it has been found advisable to change the air some ten to fourteen times per hour to ensure satisfaction, and this has been found perfectly practicable. I do not understand Mr. Forest when he says that the central hall principle has had to be abandoned in some cases (not in London) on account of mechanical ventilation being imperative. Such, however, is not my experience, as I have built a great number of schools with a central hall, and have never heard of any ill-effects from want of ventilation. I cannot agree with Mr. Forest's remarks upon what he considers the weak point of a central hall being surrounded on all sides by classrooms, as the arrangement has been found very satisfactory in practice, and after several years' test—of course, I refer to one-story schools.

As to the general remarks with regard to the mechanical system of ventilation, these seem to evidence a feeling of satisfaction with the principle. I quite agree that it is the most scientific method of warming and ventilating school buildings. But I am bound to say that prejudice upon the part of the teachers frequently prevents its best results being obtained, the occasional insistence of open windows deranging the whole working of the apparatus. On the other hand, in several cases where the rules are complied with the beneficial results are fully appreciated. At a school I visited in the provinces some years ago I recollect inquiring why the windows were opened, and the teacher in charge of a classroom informed me she could not live unless this was done. I suggested that the windows should be closed for an hour whilst I looked over the building, and upon my return to the room she remarked that certainly the room was more comfortable than she had previously found it.

T. J. BAILEY,
Architect (Education),
London County Council.

August 26, 1907.

Illustrations.

DOORWAY, ST. MARY'S CHURCH, MOORFIELDS.

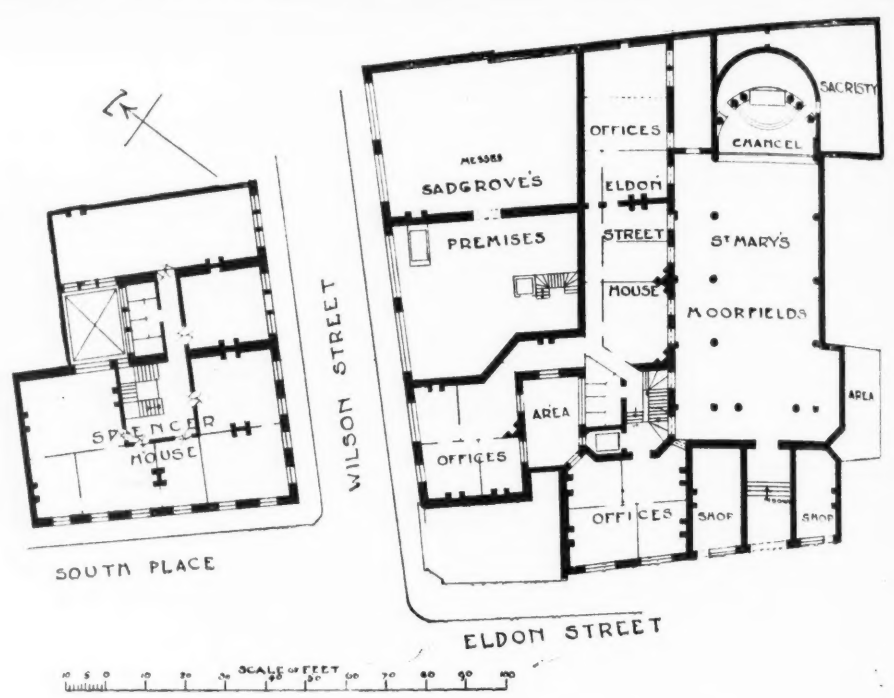
WHEN the Church of St. Mary, Moorfields, had to be removed from its former site at the end of Liverpool-street to make way for City improvements, a new site was found for it in Eldon-street, and the new church has now been erected there, from the designs of Mr. G. Sherrin.

The contractors were Messrs. Holliday & Greenwood, and the carving was executed by Messrs. John Daymond & Son.

PREMISES, ETC., ELDON-STREET, E.C.

A LARGE block of business premises has been erected adjoining the new Church of St. Mary, Moorfields. About half of these premises are Messrs. Sadgrove's new furniture warehouses and showrooms, with frontage to Wilson-street, and the other half forms a large block of offices known as Eldon-street House, having frontages to Eldon-street and Wilson-street, and with windows lighting over the roof of the church. These buildings were carried out by Messrs. J. W. Falkner & Sons, the architect being Mr. G. Sherrin.

The building upon the opposite side of the street, at the corner of Wilson-street and South-place, formed part of the original premises of Messrs. Sadgrove & Co., but upon the completion of their new building this was no longer required by them; the building has therefore been converted for use as independent business premises, and is known as Spencer House. The old structure was formerly faced entirely with stock brickwork, and this has been allowed to remain in its former state and dark colour, stone quoins and cornices were inserted, rubbed red brick aprons and arches were put to the old window openings, which were filled in with new casements, and lead lights and green sun shutters were put to the outside. An additional story was constructed in the roof, and the interior of the building was entirely remodelled and brought up to date as suites of offices and business premises. These alterations were carried out by Messrs. Spencer, Santo, & Co.



St. Mary's Church and Premises, Moorfields, E.C. Plans.

WALL PAINTINGS, ST. AUGUSTINE'S CHURCH, TUNBRIDGE WELLS.

THE subjects here illustrated represent three out of a series of mural paintings executed by Mr. N. H. J. Westlake in St. Augustine's Church at Tunbridge Wells. They illustrate events in the life of St. Augustine, beginning with his mission by Pope Gregory the Great, and closing with the scene of his death at Canterbury.

The subjects are taken throughout from Bede's History, and are as follows:—

Pope Gregory sends St. Augustine to England.
St. Augustine landing.
St. Augustine preaching before Ethelbert.
St. Augustine baptêses the King.
St. Augustine is consecrated at Arles. (*Fig. 3 in Plate.*)
St. Augustine receives SS. Lawrence, Mellitus, and others.
St. Augustine receives the pall.
St. Augustine cures the blind man (*Fig. 1*).
St. Augustine dies at Canterbury (*Fig. 2*).

The subjects form a continuous frieze, 150 ft. in length. The legend shown in Fig. 2 is that which relates how St. Augustine established the authenticity of his mission by executing a miracle of healing on a blind man, "who was first brought to the bishops of the Britons, and received neither healing nor comfort by their benediction." The other two subjects sufficiently explain themselves.

COMPETITION DESIGN FOR WESLEYAN HALL, WESTMINSTER.

THIS was a design submitted by Mr. W. F. Harber in the first competition for the Wesleyan Hall at Westminster, though the perspective view here published is, we presume, one worked out afterwards, and not the actual competition drawing.

We publish it because it is a creditable and interesting example of originality in architectural design. Whether the general scheme of treatment of the plan, with the entrance at the angle, is the best way of meeting the problem, may be questioned; but on the scheme adopted the plan is cleverly worked out, and has a good deal of merit.

The conception as a whole may be thought eccentric, but at all events it is not commonplace; and we should not be surprised to find its author successful in some future important competition.

Obituary.

SIR W. R. COPLAND.—Sir William Robertson Copland, LL.D., died on the 19th inst., at his residence, 20, Sandyford-place, Glasgow. For the past year his health had been indifferent, and he was forced to reduce much of his work but it was not generally known that his condition was alarming. Death was due to heart failure. Born at Stirling in 1838, Sir William Copland was educated at the High School of that town, and subsequently at the High School of Glasgow and the University of Glasgow. At the University he was first prizeman in mathematics and in civil engineering. Civil engineering he chose as his profession, and his practical knowledge of it was gained chiefly in the office of the late David Smith, C.E. Later he joined the engineering staff of the old Edinburgh and Glasgow Railway. From 1862 to 1866 he held the position of Burgh Engineer in the town of Paisley, which post he forsook to enter business in Glasgow as a civil engineer on his own behalf. He acted as consulting or constructing engineer in connexion with many great water undertakings in the United Kingdom, and his fame is spread so far as Iquique, in Chili, where he carried on extensive operations for the supply of water. As witness, arbiter, or oversman his services were constantly requisitioned in connexion with water schemes or disputes related thereto. He was a member of the Institution of Civil Engineers, London. As chairman of the governors he took a prominent part in the building of the West of Scotland Technical College, Glasgow. He was knighted last year, and received the honorary degree of LL.D. at the recent opening of the new medical and natural philosophy departments of Glasgow University.

MR. BENJAMIN PATTERSON.—The death is announced, at the age of seventy, of Mr. Benjamin T. Patterson, senior partner of the firm of Patterson & Kempster, quantity surveyors, Dublin. Mr. Patterson began life in the office of Deane & Woodward, and studied in the Engineering School of Trinity College, becoming a graduate of the University of Dublin. Starting as a quantity surveyor, he established an extensive practice, in partnership with Mr. John Kempster. Amongst the larger works for which he was surveyor may be mentioned the Science and Art Museum, Dublin, and the Portrane Asylum. The firm also did a large amount of work for the Government Departments, and a year or so ago they were appointed in conjunction with Messrs. Geo. Corderoy & Co., of London, quantity surveyors to the New Royal College of Science, Dublin, which is at present in course of erection.

MR. FORD.—The death, on August 19, is announced of Mr. Francis Ford, in his seventy-seventh year. Mr. Ford was Secretary of the Society of Art Masters, late Curator of the Royal Architectural Museum, Tufton-street, Westminster, and formerly editor of the *Bury and Norwich Post*.

MR. E. LATHEY.—The death of Mr. Edwin Lathey, principal of the firm of Lathey Brothers, builders, of St. George's Works, New-road, Battersea Park, S.W., took place at his residence, Lowlands, Middle-Bourne, Farnham, Surrey, on Tuesday, August 13, after ten months' illness. Mr. Lathey was in his seventy-sixth year. The funeral took place on Saturday, August 17, in the churchyard of St. Thomas-on-the-Bourne, Farnham, and was attended by many of his friends and a number of employees from London.

MR. LECK.—Mr. William Leck, of Johannesburg, and formerly of Glasgow, died on August 10 at Durban. Mr. Leck was a son of Mr. William Leck, of Belfast, and was a Fellow of the Royal Institute of British Architects.

MR. GOLDIE.—Mr. John Goldie, the well-known steeple-jack, was killed on August 20 by falling to the ground from the top of the Townsend chimney, Glasgow, which is 488 ft. high.

GERMAN AND BRITISH EXPORTS OF CEMENT COMPARED.

THE present position of the German cement industry is described by Sir William Ward, British Consul at Hamburg, as being upon the whole satisfactory. At the end of last year the works existing in Germany were employed to the utmost of their capacity, and the firms at Hamburg and elsewhere who were engaged in the cement trade are said to have done a fairly profitable business. Very considerable quantities of German cement were last year again exported for the account of Hamburg firms, though a large portion of the amount shipped from that port is merely transit trade for the account of the German factories situated in the interior. The total number of larger cement works at present existing in Germany is stated to be about eighty, while there are besides a very large number of works of less importance. Of the various groups of German cement works formed many years ago, according to their geographical position, some had recently been dissolved, but they have now all become reunited. The conditions under which the works forming these different groups have combined together are not in all cases the same, for whilst several bear the character of a trust for the sale of the products of the works belonging to each group, being left to a syndicate, the factories belonging to other groups attend themselves to the sale of their products, and are merely obliged to keep to the sale prices agreed upon between all the various groups of German cement works. The exact extent of the total German cement production in 1905 is not at present ascertainable; it may, however, be roughly estimated at 15,000,000 casks (of 170 kilos. each), and it may be regarded as probable that the production in 1906 has been still greater. Considering that the number of cement works now existing not only in Germany, but also in the United Kingdom, France, and Belgium, without mentioning other European countries, is such a large one, and that the total cement productions in all parts of Europe has been increasing from year to year, the necessity of finding fresh markets for this constantly expanding output is naturally felt also by the German cement industry to be a question of urgent importance. The following figures will show the total annual quantity and value of the export of cement from Germany during each of the six years 1900–05, viz.: In 1900, 600,386 tons, value 1,271,900*l.*; in 1901, 560,612 tons, value 921,700*l.*; in 1902, 699,378 tons, value 999,800*l.*; in 1903, 742,381 tons, value 900,500*l.*; in 1904, 635,248 tons, value 836,300*l.*; in 1905, 675,664 tons, value 890,500*l.* It will be seen that whilst with certain fluctuations the total volume of the exports of cement from Germany has increased during the six years 1900–05 by about 75,300 tons the value has decreased by 381,000*l.*, thus showing the considerable fall which has taken place in price. During the same period the total cement exports from the United Kingdom (according to Board of Trade returns) have been as follows:—In 1900, 673 tons, value not known; in 1901, 584,000 tons, value not known; in 1902, 521,000 tons, value not known; in 1903, 399,988 tons, value 676,752*l.*; in 1904, 384,583 tons, value 632,356*l.*; in 1905, 456,558 tons, value 721,786*l.* The principal markets for British cements are, in order of their importance, British India, South Africa, Canada, New Zealand, the Argentine Republic, Brazil, Australia, and the United States of America, etc.; whilst the principal markets for German cement are the Netherlands, the United States of America, Belgium, Brazil, Austria-Hungary, South Africa, Denmark, etc. Until a few years ago the United States of America imported very much larger quantities of cement both from the United Kingdom and from Germany than at present, but during recent years, as is well known, the cement industry in that country itself has been rapidly growing in importance, and from being merely a country of import the United States of America have now become one of export, and have even of late begun to enter into competition with other exporting States—for instance, to South America, where the consumption of foreign cement is now increasing from year to year.

The Student's Column.

MODERN METHODS OF USING GAS.—VIII.

Church Lighting—School Lighting.

CHURCH LAMPS.—The lamps used in a church should be free from cheap pretentious ornamentation, and the light they yield should be soft and mellow. At the same time the lighting should be sufficiently good to enable those assembled together to easily read a book printed in "minion" type.

The typical church, with its pillars and arches and high-pitched roof, cannot be lighted uniformly throughout, and it is better to use a considerable number of lamps of moderate candle-power than a few lamps of very high candle-power. All mantles should be obscured by the use of suitable shades of ground glass, opal glass, or other material which will prevent the eye from seeing the form of the mantle.

Lighting Influenced by Form of Worship.—The intensity of the light to be provided in a place of worship must differ with the form of worship adopted therein. Tastes are very widely divergent upon the subject of lighting. The lighting which one man appraises as pleasant and reposeful, and well attuned to the solemnity of the place, another condemns as a mournful glimmer conducive to misery. The design of the lamps and the intensity of the light they emit should, like the architecture of the building and the description of the music, vary with the form of worship to be used in the building.

The flood of garish light which is, perhaps rightly, used in halls built for large assemblies which delight in mighty shoutings, accompanied by the inspiring clash of tambourines, would be altogether out of place in the mediæval abbey where worship takes the form of subdued chanting accompanied by the somewhat solemn strains of an organ.

With regard to gas fittings for ancient buildings, there is no reason why lamps for use with gas should not be as artistic in form as the lamps used with any other illuminant. It is true that there still exist certain people who will gaze with raptuous delight upon a plain and tarnished fragment of a Babylonish oil-lamp, and who will cry out with horror at the name of gas-lamp; but this vulgar affectation now happily finds favour only with a few pseudo artists.

Advantages of Incandescent Lighting.—The introduction of incandescent lamps into churches has made it possible to light the buildings more satisfactorily and more cheaply than was possible when luminous flames were employed. The great reduction in the quantity of gas required to light a building by the incandescent system has been accompanied by a corresponding reduction in the quantity of heat generated, and this is a great advantage in the summer months.

Inverted versus Upright Lamps.—Many churches are lighted with upright incandescent burners. Of these, the No. 3 Kern burner has been found satisfactory, and it has the advantage of not requiring a glass chimney. Each No. 3 Kern burner fitted with a suitable mantle will yield light of about 70 candle-power, and this is quite powerful enough for use in most churches, even when suitably shaded. The more pleasing appearance of the inverted burner has, however, caused it to be chosen in preference to the upright form of burner in many churches within the last two years. The lamps should be so located, or so protected, that glass falling from a broken shade cannot do any damage. The shades used with inverted mantles are sometimes encased in nickel wire guards.

Turning Down the Lights.—It is a common practice in places of worship to turn down the gas at a certain stage in the service, and some persons have complained that when gas burning in an inverted burner is turned low the flame has a tendency to deposit soot on the mantle and on the burner. The writer has not experienced this trouble, but it probably does occur with some burners, and the trouble can be obviated by having a by-pass to each burner and arranging the gas distribution in such a manner that alternate burners can be completely extinguished (with the exception of the by-pass flames) while the other burners remain full on.

Position of Lamps.—The most satisfactory effects are usually obtained by suspending the lamps from the roof, but such lamps are often difficult of access, and precautions must be taken to prevent glass from falling upon persons passing beneath the lamps. A less pleasing but more economical method of lighting is to place the burners upon standards which hold them a few feet above the heads of the people assembled. It is necessary that the standards should be firmly fixed, and not liable to be shaken by persons stumbling against them.

School Lighting.

Intensity of Light.—For the lighting of schools it is usual to allow 1 candle-power for every 3 sq. ft. of floor area. This is the same rule as that adopted for domestic lighting. A room having a floor area of 900 sq. ft. would, therefore, require a sufficient number of burners to yield light of 300 candle-power. Five burners of 60 candle-power each would probably be used. There is, however, a tendency to increase this allowance, and provision of 1 candle-power for every 2 sq. ft. of floor area is not uncommon. It is obvious that the rule is not equally applicable in all cases. A room with a flat, whitened ceiling, and having its walls lined with white-glazed tiles, need not be provided with so much light as a room of similar dimensions having a dark timbered ceiling and walls painted with a dark colour.

Reflected and Diffused Light.—It is very desirable that the eyes should be shielded from direct rays of light from the mantle. Opal shades and opal reflectors should be used in order that the light may be well diffused. The best form of lighting is that in which light from concealed lamps is thrown upwards upon a flat, whitened ceiling, and then downwards into the room, but this is impracticable in most schools, and, as the ceiling becomes dirty the intensity of the light reflected into the room rapidly diminishes. Owing to the very small cost of light emitted from incandescent mantles some schoolrooms are too brilliantly lighted. It is as necessary to avoid excessive intensity of light as it is to avoid working in a light so feeble that the eyes are subjected to an improper strain.

General Building News.

ROMAN CATHOLIC CHURCH, CASTLETOWNBERE, COUNTY CORK.—The foundation-stone was laid recently by the Most Rev. John Mangan, D.D., Lord Bishop of Kerry, of the new church at Castletownbere. The west front of the new building will have as its chief feature a doorway with a range of traceried niches over it, and will be lighted by a rose window deeply recessed within a pointed arch. Bell turrets flank either side of the west front. The tower is placed abutting on the nuns' choir on the south side of the nave, and will rise to a height of about 180 ft. The plan comprises a nave 27 ft. wide, with an arcade of six bays, portion of the west end being enclosed within a screen to form a narthex. Left of the principal entrance is the baptistery, and on the right a mortuary chapel. The side aisles are each 12 ft. wide in the clear, and divided from the nave by the arcades before referred to. The chancel is square-ended. Right and left of the chancel are two side chapels and the nuns' choir. The chancel is 36 ft. deep, and divided into upper and lower choirs, the latter being raised 3 ft. over the former. The chancel is divided from the side chapels by an arcade of two bays. The vestries comprise separate sacristies for priest, and vestry for altar boys. The two rooms are divided by a sliding partition, and can be thrown into one when required. A feature of the exterior will be a copper-coloured flèche rising over the chancel arch. The materials proposed to be used will be, as far as possible, Irish—Irish slates on the roof, Wexford cement in the concrete work of foundations, floors, etc. Grey granite from Messrs. M'Cartan & Co.'s Castlewellan, County Down, quarries will be used both internally and externally. In the nave arcade columns it is proposed to use Castlewellan granite. The architects are Messrs. Butler & Donnelly, their design being selected in a competition limited to six architects practising in Dublin and Cork. Mr. Robert Kelly, of Bantry, is the contractor.

WESLEYAN CHURCH, KILHAM.—A new Wesleyan church has been opened at Kilham. The church has been built to seat 220 persons, and has two aisles. There are also provided an organ chamber, a heating chamber, and a vestry. The front elevation is of Accrington red-faced bricks, and the side elevations of Lincolnshire red bricks, and the dressings are of stone. The principal timbers are of pitch-pine. The floors are laid in "raking," and the floors of the pews are raised 4 in. above the aisles; and the church will be heated on the high-pressure non-freezing fluid system. Mr. S. Dyer, Bridlington, has been the architect, and the contractors Messrs. T. Postill & Sons, Bridlington; while Mr. G. R. Preston, Bridlington, has been responsible for the stone work.

BOULTON PARISH CHURCH.—A stone to commemorate the building of the south aisle and vestry at this church was laid recently by Lady Alexandra Paget. The estimated cost of the work is 1,200*l.*, and the enlargement will give accommodation for an additional 100 worshippers. The plans were prepared by Mr. J. Nuttall, and the contractors are Messrs. W. Ford & Son, Derby.

ST. GENNY'S CHURCH.—The tower of St. Genny's Church, situated between Bude and Boscastle on the north Cornish coast, is to be restored. Mr. E. Sedding, architect, estimates the cost of restoration to be about 350*l.*

SOUTHWELL MINSTER.—Acting on the advice of Mr. W. D. Caröe, the Ecclesiastical Commissioners are having both transepts of the cathedral church of St. Mary, Southwell, shored up and underpinned, and the foundations are to be replaced, if necessary, with sounder material. The pins have been inserted on both sides, and a start has been made with the north transept, which is already shored up. Excavations have been made in two places, and the foundations, which consist principally of rubble and stone, are being taken away. The present foundations are about 5 ft. deep, but the new, of concrete and brick, will be taken a couple of feet lower, and be built broader. The parts affected with the nave form the oldest portion of the cathedral, having been built between 1110 and 1115 by Archbishop Thomas.

BIBLE CHRISTIAN CHAPEL, YARNSCOMBE.—A new chapel is being erected by the Bible Christians of Yarnscombe, Devon. The work is being carried out from plans by Mr. S. Parsons, of Holsworthy, the builder being Mr. A. Darch, of Yarnscombe.

WORKHOUSE CHAPEL, GAYTON.—A chapel has been erected at the Gayton Workhouse. Externally the building is of Carr-stone, and internally it has an open stained roof, nave and apse, the walls of the nave being coloured white. Mr. L. F. Eagleton, of King's Lynn, prepared the plans.

WESLEYAN CHAPEL, TERN HILL.—A new Wesleyan Chapel is being built at Tern Hill. The work is being carried out by Mr. A. Wood, of Market Drayton, and the architect is Mr. G. A. Craig.

COUNCIL SCHOOLS, SOUTHWICK.—The Education Department, acting through the Durham County Council, have had a new school erected in this town on a site abutting on to Clarence-street. The designing and carrying-out of the schools was placed in the hands of Messrs. G. T. Brown & Joseph Spain, architects, Sunderland, the contract being let to Mr. W. B. Cooper, contractor, Sunderland. The schools are in two blocks, that towards the front providing accommodation for 300 infants in six class-rooms, with a marching corridor, and the usual cloak-rooms, lavatories, teachers' rooms, etc. At the south end of the site, abutting on to Clarence-street, is arranged the science department, which has been planned not only for the use of boys and girls attending this school, as well as other schools in Southwick, but also for the students using the evening classes, which it is intended to hold there in cookery, laundry-work, manual instruction, chemistry, and physical science. The other part of the buildings to the east of the site is planned with one large central hall for the use of both boys' and girls' departments. In this block the boys' school is arranged to the north, and the girls' to the south, with the central hall in between, having access from both departments. Each department has accommodation for 300 in six classrooms, with cloak-rooms, teachers' rooms, and the usual accessories. The schools, which are built of brick, are faced with Jones & Maxwell's Pelaw facing-bricks, relieved with dressings of Burmantoft's terra-cotta. All rooms and corridors have glazed brick dados, and the floors are of solid wood block flooring on concrete. There is ample inlet and outlet ventilation, the contractors for which have been Messrs. C. Kite & Co., of London. The heating is by means of special ventilating stoves, through which fresh air is admitted into the rooms, which is warmed in winter. The slating work has been done by Mr. Digby Nelson, Sunderland; Mr. J. B. Wilkinson has been responsible for the carrying out of the plumbing and sanitary arrangements; Messrs. G. N. Arnison & Sons have done the painting and glazing; while the wood block flooring has been done by Messrs. Turpins, of London. Mr. T. Weddell was the clerk of works.

PUBLIC SCHOOL, DENNY, N.B.—The School Board of Denny have decided to build a new school at Dennyloanhead. Plans have been prepared by Mr. Strang, architect, Falkirk, and offers received. The school is to be capable of accommodating 360 scholars, and is to cost 4,000*l.*

WESLEYAN SUNDAY SCHOOL, HEXHAM.—On the 15th inst. the foundation-stones were laid of the new Sunday school, caretaker's house, etc., which the Wesleyan Methodists of Hexham are erecting at the rear of their present church premises in Beaumont-street. The scheme also provides for an extension of the organ chamber in the chapel for the accommodation of the choir, for the provision of additional pews, and for an additional front entrance to the gallery. Several alterations and improvements are to be carried out to the present premises, including the provision of a kitchen, vestry, etc. The new school-room will accommodate 280, and it is so arranged that the two classrooms at the end (which are fitted with swivel shutters) can be added, which will give forty-six seats, making the total accommodation 326. The architect is Mr. J. Walton Taylor, of Newcastle, and the contract for the work has been let to Mr. Thomas Dorin, builder, Hexham.

COUNCIL SCHOOLS, KINGSTON.—The new schools which have been erected by the Borough Education Committee in Richmond-road are now completed and ready for use. The building was designed by Mr. Roper, and the work has been carried out by Mr. F. G. Lawrence, contractor, at a cost of 10,237*l.* Mr. R. Squelch has been clerk of the works. The new block provides accommodation for 354 boys on the ground floor and for 354 girls upstairs. The arrangement of the rooms is in each case identical. There is a central hall where the whole school assembles, and ranged round the hall are eight classrooms, each accommodating from forty to fifty scholars. One room in each department is specially fitted up as a science-room, but will also be utilised for ordinary classes. The interior walls are of glazed bricks up to about 4 ft. in height, and the rest is coloured. In each room there is a low platform of three tiers, so that the scholars at the rear can see and be seen as well as those nearer the teacher. The floors are of wood blocks. There is in each department cloak-room accommodation, each child having two pegs upon which hat and overcoat may be hung. There are also six lavatory basins for the use of the boys and a similar number in the girls' department, with store cupboards, private rooms for the head teachers and retiring rooms for the assistant teachers. The whole of the ground that is unbuilt on, both at the front and rear of the schools, is asphalted, and there are covered sheds for shelter in the event of rain. The infants' department is not new, but at the instance of the Board of Education certain improvements have been carried out. The total provision at the Richmond-road schools will be for 1,062 children.

BAPTIST SCHOOL-CHAPEL, EPSOM.—The foundation-stones of the school-chapel, which is to be erected by the Epsom Baptist Church in Church-street were laid a short time ago. The main room of the building will be capable of seating 250 people, and there will be classrooms and a vestry in addition. A baptistery is also to be constructed. The builders are Messrs. Williams & Taylor, of Epsom, and the architect the Rev. T. F. Waddell, of Dorking. The total cost of the building, inclusive of seating, heating, etc., will be about 1,250*l.*

WESLEYAN SCHOOLS, LOWESTOFT.—New Wesleyan schools are being erected in Crown-street, Lowestoft. Mr. R. S. Cockrill is the architect of the work, Mr. T. Yelf, of Norwich, being the builder. The total cost of the scheme will be about 3,500*l.*

ALTERATIONS, JESUS COLLEGE, OXFORD.—Alterations and additions are being carried out at Jesus College, Oxford, with Doulting stonework supplied by the Ham Hill and Doulting Stone Company, Ltd. The architect is Mr. R. England, of Oxford, and the builders are Messrs. Estcourt & Son, of Gloucester.

CHURCH HALL, STRATFORD.—A new church hall is being built adjoining St. Thomas's Church, Stratford. Messrs. Gale, Durlacher, & Emmett, architects, prepared the plans for the work.

NEW WAREHOUSE, MANCHESTER.—A packing warehouse is being built in Princess Street by the Refuge Assurance Company for Messrs. James Robinson, Ltd. The architect is Mr. I. R. E. Birket, of Manchester, and the ironwork has been contracted for by Messrs. Edward Wood & Co., of Salford.

SAVINGS BANK, PRESTON.—The new Preston Savings Bank was recently opened by Sir Albert Rollit. The new premises have been erected from the designs of Mr. W. H. Thwaites. Polished Shap granite has been employed in the base and doorways, and the remainder is of polished Darley Dale stone, a balustrade and carved caps and shields giving the ornamentation to the exterior. There are two entrance doors, both facing into Church-street. The banking room is 60 ft. square and 20 ft. high, with a counter space of 65 ft. On the ground floor also is the board room, 36 ft. by 27 ft., and the structure contains all the conveniences and accommodation of modern building. The work was commenced in 1905, and has cost, including furnishing, 12,000*l.* exclusive of the site.

WEST ISLINGTON PUBLIC LIBRARY.—The branch library in Thornhill-square, Barnsbury, which was opened two or three weeks ago, was built after Professor Beresford Pite's plans and designs. The lending library, arranged upon the "open access" system, and the children's library occupy the ground floor; underneath is a large lecture-room. On the first floor are the reading-room and reference library. The building has a plain elevation; the staircase and panelling are of oak.

BONDED WAREHOUSE, GLASGOW.—The new warehouses and bonded stores in Washington-street, which have just been erected for Messrs. James Buchanan & Co., have a capacity for 20,000 butts in store and for 30,000 gallons and 70,000 gallons in the bottling and blending departments. The main building is six stories high, the total floor space amounts to six acres in area, and office accommodation is provided for two supervisors and a staff of twenty officers of the Inland Revenue Department. The buildings have a main façade of Locharbrigge stone, and were erected after Mr. H. E. Clifford's plans and designs in the later Renaissance style.

FACTORY, KIRKCALDY.—The Fife Linoleum Company, Ltd., have taken a large site in Commercial-street, Pathhead, Kirkcaldy, for the erection of a factory, which will have a main chimney-stack about 190 ft. high. The plans and designs of the buildings have been prepared by Messrs. J. D. Swanston & Syme, of Kirkcaldy.

PREMISES, GLASGOW.—Good progress has been made with the buildings at Scotstoun for Messrs. Yarrow & Co., who have contracted with Sir William Arrol & Co. for the general constructional work; a sub-contract for excavating the basin, 330 ft. by 86 ft. and 16 ft. deep at low water, and for building work has been taken by Messrs. Morrison & Mason, of Glasgow. The premises have a frontage to the Clyde of some 780 ft., and cover a total area of 61,530 sq. yds. Nearly one half of the river frontage is taken up by launching slips, inclined anglewise to the river: the wet basin to the west is to be roofed in and fitted with a 50-ton electric travelling crane. The shops, the pattern-shop excepted, are being built of steel filled in with brick; the Clyde Valley Electric Power Company will supply the works, and the motors will be of the alternating current kind.

MANCHESTER WAR MEMORIAL.—Negotiations between the Manchester War Memorial Committee and the Manchester Corporation about the site for the memorial which is to be erected in Manchester to perpetuate the services of the men of the Manchester Regiment in South Africa are proceeding satisfactorily, says the *Manchester Guardian*. The Committee propose to place the war memorial in Albert-square, at the point where the Bishop Fraser statue and the fountain now stand, and to transfer the Bishop Fraser statue to the St. Peter's Church site and the fountain to Heaton Park. Mr. Hamo Thornycroft has practically completed the war memorial. All that remains to be done is to engrave on the base the names of the men who lost their lives in South Africa. The work has cost about 2,000*l.*

PROPOSED IMPROVEMENTS AT SOUTHEND.—At a recent meeting of the Southend Council the Pier Committee reported that the Borough Engineer had submitted amended plans of the proposed improvements and additions at the Pier-head. After some discussion it was decided to adjourn consideration of the matter. The scheme comprises an upper promenade deck, extending over about two-thirds of the total area of the new Pier-head. The total area of the new deck will be about 11,250 super. ft., of which a central area of about 4,500 super. ft. will be enclosed by shelters. These shelters will be provided with seats on both sides. The total length of seats will be about 900 ft., of which about 250 ft. will be inside the enclosure. A promenade, averaging about 9 ft. in width, will surround the upper deck. The seats will be back to back, with a glazed partition behind, and be covered by a light ornamental roof. It is proposed to provide a bandstand in the enclosure. The new dock will be carried on iron and timber columns, and will be supported by steel girders. It will be approached by four staircases—two on the northern end, one at the south-east, and one at the south-west. The existing refreshment-room and other buildings will be retained and extended so as to give accommodation for six shops, ladies' lavatory, and cloak-room, office for left luggage, and refreshment-room. The estimated cost of the work is about 5,200*l.*

PROPOSED RECONSTRUCTION OF THE PERTH INFIRMARY.—At a recent meeting of the directors of the Perth Infirmary it was agreed to carry out an extensive scheme of reconstruction, the cost of which will amount to about 20,000*l.* The plans prepared by Mr. Mackay, architect, were under consideration, and after discussion it was resolved to recommend them to a meeting of

subscribers to be held in October for adoption, with the explanation that while the buildings alone would cost about 15,000*l.*, the raising of a sum of 20,000*l.* was absolutely necessary to complete the scheme. The alterations are to consist of a new boiler-house and nurses' home facing New-row. The present entrance to the Infirmary is to be altered so as to give a better gradient to the institution. The wards are to be reconstructed, as well as the whole of the interior arrangements of the institution.

Stained Glass & Decoration.

MEMORIAL WINDOW IN ST. CUTHBERT'S, EDINBURGH.—A new stained-glass window has been put in on the north wall of this church, to the memory of Alexander Ballentine. The subject of the window is Abraham, prepared to offer up his son Isaac. The window was designed and executed by the firm of which Mr. James Ballantine is now the head. The tablet beneath bearing the dedication was designed by and executed under the care of Mr. A. F. Balfour Paul, architect. It takes the form of a marble panel set in an enriched frame of stone and black marble, and surmounted by a broad cornice and carved pediment of stone. A warm, grey-toned freestone has been used, and the panel is of dove-coloured marble.

Appointment.

ELECTRICAL ENGINEER, CHICHESTER.—Mr. Horace Boot, M.Inst.E.E., A.M.I.Mech.E., of Great George-street, Westminster, S.W. (who is retained by the Tunbridge Wells Corporation as their Consulting Engineer), has been appointed Consultant Electrical Engineer to the Chichester Electric Light and Power Company, Ltd., to prepare plans, specifications, etc.

Sanitary and Engineering News.

NEW WATERWORKS, MILLPORT, N.B.—The formal opening of Millport Waterworks took place on the 23rd inst. The new reservoir has an area of over seven acres and a capacity of nearly 20,000,000 gallons of water, and the tank which receives the filtered water has a capacity of 180,000 gallons. Mr. Niven, engineer, was the author of the scheme, Mr. M'Bride being the contractor.

COMBINED DRAINAGE.—The Medical Officer of Health for Lambeth in his annual report states that many combined drainages have been reconstructed by the Council during the past year at a cost amounting to 1,301*l.* as the direct result of inspections carried out by the inspectors in the course of their daily routine duties. The law, as it at present stands, throws the responsibility upon the Borough Council of repairing certain combined drainages, as sewers, and as the property of the Sanitary Authority, but a large number of combined drainages are relaid by private owners as the result of voluntary work or of the service of notices by inspectors. In these latter cases the owners are either responsible or prefer that the combined drains should be regarded as "drains" and not as "sewers."

MUNICIPAL IMPROVEMENTS, PRESCOT.—On the 20th inst. a Local Government Board inquiry was held at Prescot Council Offices by Mr. A. G. Drury, on an application by the Prescot District Council, for sanction to borrow 6,500*l.* for the construction of works of sewage disposal, and 750*l.* for the widening and improvement of High-street, Prescot. Mr. H. Cross, clerk, dealing with the proposed sewage scheme, stated that in 1903 complaints were made about trade waste being poured into the sewers, and threats were received from landowners of legal proceedings for pollution of the brook. The Prescot Council decided to remove the works, and it was later decided to provide a new scheme. A number of schemes were sent in in competition, and the one before the inspector had been accepted. Mr. Harry Taylor, of Newcastle, the engineer of the scheme, explained the scheme to the inspector, which was to treat sewage from about 120,000 gallons per day.

DRAINS AND ZYMOTIC DISEASES.—Dr. Priestley, Medical Officer of Health of Lambeth, in his annual report which has just been issued gives some interesting information with regard to tests made during the year in reference to the incidence of zymotic diseases and defects in drains. In the twelve months diphtheria occurred in 391 houses in the borough. In fifty-six of these defects were found in the drains, and in 204 defects were found in traps, fittings, and appliances. Membranous croup occurred in eleven houses, in one of which defects were found in traps, etc. Erysipelas occurred in 260 houses. Defects were found in regard to drains of twenty-five of these, and defects were found in the traps, fittings, and appliances of ninety-four; 1,124 houses were infected during the year with scarlet fever. Drainage defects were found in 148 of these, and in 585 defects were found in traps, fittings, and appliances. Typhoid fever occurred in eighty-six houses, in eleven of which defects were found in the drains, and in forty-four defects were found in the traps, fittings, and appliances. One house was infected with continued or relapsing fever, and in this house a defect was found as regards the traps, etc. Puerperal fever occurred in twenty-seven houses, and in six of these defects were found in the traps, fittings, and appliances. Altogether during the year 1,900 houses were infected, and in 240 of these defects were found in the drains, and in 935 defects were found in the traps, fittings, and appliances. The doctor points out that, of course, it does not follow that the defects were the causes of the diseases under investigation. The test used is the chemical test (Kingzett's), and when a result is obtained the drain (tested) is defective, but when no result is obtained it would be unsafe to state that therefore the drain (tested) was sound. A negative result proves nothing with the chemical (or smoke) test. The hydraulic (water) and pneumatic (air) tests are the only reliable tests, but too severe for the routine testing of drains of old buildings. The pneumatic (air) test is comparatively new, and most delicate, but it is not much used in London at the present day. Year by year, Dr. Priestley goes on to state, the number of defects found decreases. Ten years ago the percentage of houses showing defective drains in the borough was 22·3, while last year the percentage had fallen, as shown by the foregoing figures, to 12·6.

Foreign.

GERMANY.—The Architectural Section of this year's great art exhibition in Berlin is divided into two classes—the work of private architects and that of the Public Works Department. The entrances to these two sections are significant: the way to the former is beneath an intensely modern portal, designed in the style of Bruno Schmitz: to the latter through a round, arched opening of refined Italian Renaissance design, surmounted by a pediment and flanked by pilasters in delicate relief. The exhibits are more numerous than last year, but unfortunately there are no foreign contributors. Out of 132 exhibits twenty-three are models, and this increase of plastic as opposed to line representation is much to be commended.——An attempt is being made to build a "garden suburb" to Darmstadt. According to the scheme drawn up by Professor Olbrich, no site is to be under 500 square mètres, three-quarters of which space must be free from buildings, no house is to have more than one upper story, no outbuildings are to be used for dwelling purposes, not more than two houses are to be built contiguous to each other, while detached houses are to be at least 5 mètres apart. Only such designs will be passed as possess architecturally pleasing exteriors.——The Schiller Theatre in Charlottenburg was built from the designs of Messrs. Heilmann and Littmann of Munich, who have made their name in this class of building through their designs for the Prince-Regent Theatre in Munich, the "Munich Theatre," and the Royal Theatre in Kissingen. The Charlottenburg Theatre is remarkable for its severely plain treatment; the building committee required that externally it should declare itself to be a play-house for the people as opposed to the other customary luxurious and ornamented theatres. The condition of simplicity was materially aided by the restricted sum of 1,250,000 marks being furnished for the construction, decoration, and stage outfit of a house to seat 1,500, and for the erection of two large buildings in connexion with it containing a rehearsal room, rooms for popular meetings, exhibition, etc., refreshment rooms and business premises.——The design for the enlargement of Worms Guildhall have been made by Professor Theodor Fischer of Stuttgart, who also gave the design for the Cornelianums which is to be built shortly.

AUSTRIA.—The Society for reducing the smoke and dust plague has begged the Burgermaster to supply the town laboratory with means to carry on systematic experiments such as is the case in several towns of England, France and Germany. The Society considers such experiments in Vienna to be obligatory, for insanitary conditions can only be overcome by systematic scientific measures. The Board of Education has approved of the agreement between the Society and the directors of the Science Museum by which the laboratories of the Museum are to be placed at the disposal of the Society for the examination of materials for road building.——The International Architectural Exhibition arranged in connexion with next year's International Architectural Congress, Vienna, will be held from May 18 to June 14 in the galleries of the Horticultural Society. Only architects are to be exhibitors, and the exhibits to include plans, drawings, models of buildings and furniture, or other specimens of artistic craft.

ITALY.—In view of the questions which arise concerning architects' fees, copyright in design, and ownership of drawings, it is interesting to note how these are dealt with on the Continent. The Society of Italian Engineers and Architects are now compiling a scale of charges for the use of members of their profession, part of which scale is published in the annals of this society, Vol. 2, 1907. It is based on the presumption that the design remains the property of the designer, and his client may make use of it only for the work in hand. The original drawings are, however, the property of the client, but the designer retains his copyright in them. The fee for designs varies not only with the estimated value of the building, but with the class of building required. These are divided into five categories, from the simple artisan's dwelling to the complicated public building, and while the fee varies in direct ratio with the category it varies in inverse ratio with the cost of the building. Thus the fee for a building of the first category ranges from 2 per cent. for a building of 2,000*l.* or under, down to ¾ per cent. for buildings of over 20,000*l.*, and in the fifth category 5 per cent. would be paid on the lesser and 2 per cent. on the greater sum. The fee for the selected scheme is included in the fee for the final design, and the other schemes are paid for at a higher or lower rate according as they differ from or nearly resemble the selected scheme. Fees for preliminary schemes which lead to nothing are rated at from 10 to 25 per cent. of the fee which would have accrued had the building been carried out. Constructive details and decoration drawings are paid extra: ¾ to ½ per cent. on buildings of the first category on the values aforementioned, and 2½ to 1¼ per cent. on buildings of the fifth category. For restorations the same scale applies, both as regards class and cost, with an additional 10 to 25 per cent. on the resulting fee. A fee of 2 per cent. on the total cost will accrue to the superintending architect or engineer, whether he be the original designer or not. For the reproduction of drawings on paper the charge varies according to the necessary elaboration, from 1·50 francs to 6 francs per square decimetre of drawing: while tracings are charged for at one-third of that rate.

Miscellaneous.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—Mr. Lawton R. Ford, District Surveyor, West Wandsworth, has been appointed to the district of St. James, Westminster. On and after September 1 his district office will be at No. 60, Haymarket, S.W.——The firm of Parsons & Wills, Leadenhall-street, have mutually dissolved partnership, and Mr. Parsons will continue to trade under the style of Parsons & Co., at No. 48, Amhurst-road, N.

PUBLIC WORKS AT GIBRALTAR.—According to the Colonial Secretary's report on the Blue Book of Gibraltar for the year 1906 the financial condition of the colony continues to be satisfactory, the year ending with a surplus of 22,492*l.* and an asset balance of 126,316*l.* As a result many public works, the execution of which had been postponed from time to time for want of funds, have recently been taken in hand and carried out. The Government slaughter-houses have been properly drained and considerably improved. The floors have been relaid on modern principles, and the walls have been covered to a suitable height with white glazed tiles. The sanitary condition and general appearance of the buildings have been greatly improved and brought more up to the standard of modern requirements. The Governor's summer residence, which had been allowed to fall into a state of disrepair, has been thoroughly restored and furnished throughout. Additions and alterations have been made to the stables at Government House ("The Convent"), and the drainage system has been overhauled and renewed. Several additions and improvements have been made to the colonial hospital. A new Sisters' Home and two new wards have been provided. The bonded stores at Waterport have been improved. A waiting-room and offices have been provided for the service of the Algeciras Company's steamers plying between Gibraltar and Algeciras; various Crown properties in the occupation of Government officials have been improved and thoroughly repaired, and others have been put in order and let at moderate rents to public officers, in pursuance of the policy which has been laid down. The police barracks, the erection of which had been under consideration for many years, were begun in 1905. A small portion has been completed and is occupied. The site is an excellent one in a healthy position in the upper part of the town. Barracks for the accommodation of a small detachment of police to be stationed at the south part of the town have also been commenced.

INTERNATIONAL CONGRESS FOR THE DEVELOPMENT OF DRAWING AND ART TEACHING, LONDON.—Further progress has been made with the arrangements for the approaching Congress, to be held in London in 1908. The Congress is to be held from August 3 to August 8, 1908, and the Congress exhibition will probably be opened about a week earlier. Official invitations are to be sent to all foreign Governments through the British Foreign Office. All exhibits intended for the exhibition must be sent in by June 1, 1908. All papers for the Congress must be sent in by May 1, 1908; they may be written in English, French, or German. The Congress will sit as a whole except on one day, which will be devoted to sectional meetings. Arrangements will be made whereby such subjects as may be desired by a sufficient number of members of the Congress shall be discussed on the sectional day. So far as possible arrangements will be made for the exhibits of the various nations to be in charge of representatives who can explain their scope and purpose in the three official languages of the Congress—English, French, and German. Arrangements are being made for the appointment of local treasurers and secretaries in all foreign countries. Such officers have already been appointed for France, Germany, and the United States. The United States are making arrangements for sending 200 art teachers over to attend the Congress. With regard to Great Britain, local exhibitions will be organised throughout the country, from which exhibits for the Congress exhibition can be chosen. The organising secretary of the Congress is Mr. C. M. Mathews, 151, Cannon-street, London, E.C.

DEMOLITION OF HISTORIC BUILDINGS IN DUNFERMLINE.—The work of demolishing a number of old buildings in St. Catherine's Wynd, Dunfermline, has been begun, with the object of widening a narrow street. Shortly after the Carnegie Trust was founded, that body acquired several of the houses which adjoin those conveyed to them, along with Pittencrieff Glen, which they overlook. In 1904, when the chairman of the Trustees proposed to erect a new library on the site occupied by the southmost of the houses, there was a great outcry among archæologists and antiquarians throughout the whole of Scotland at what was then described as a proposed act of vandalism. By a number of eminent authorities a memorial was lodged with the Carnegie Trustees pleading for the preservation of the buildings. That memorial had some effect in causing the library project to be abandoned, and the proposal either to demolish the buildings or to build an institution of the character then intended had up till recently not been heard of. In the memorial it was pointed out that old buildings, unlike pictures or sculpture, belonged to the place of their origin, and could not be imported, and that no money could give to a modern manufacturing town objects possessing the living interests of those old buildings. With the exception of the southmost, the whole of the other buildings, with their fiddle or corbie-stepped gables, are now to be razed to the ground, and the existence of the southmost, part of which is tenanted, is believed to be only a question of time. The removal of the buildings will give an unobstructed view into Pittencrieff Glen from St. Catherine's Wynd. Their place will be taken by a low retaining wall to support the widened street.—*Glasgow Herald.*

MEMORIAL TO THE VICTIMS OF THE SALISBURY DISASTER.—Mr. Whitelaw Reid, the United States Ambassador, recently unveiled a tablet which has been placed in Salisbury Cathedral as a memorial of the passengers who were killed in the railway accident at Salisbury last year. The design of the tablet, which is erected on the wall of the north aisle, consists of a central panel of light yellow marble. This is contained within a pediment in which is placed a plain Greek cross of white marble, and supported by a corbel, both pediment and corbel being formed from North Staffordshire alabaster. On the central panel is carved an inscription recording the object and the names of the twenty-eight persons whom it commemorates. The pediment is supported by two pilasters of white marble, on which are carved pendants of flowers, the pilasters being supported on cherubs. On each side with a rusticated background is an angel bearing a shield, the figures being carved in white statuary marble. The shield on the dexter side is charged with the arms of England and that on the sinister side with the arms of America. The cornice and pediment are enriched by Echinus carving. The tablet was designed by Mr. C. E. Ponting, F.S.A., Diocesan Surveyor.

MEMORIAL ARCH, DUBLIN.—On the 19th inst. the inauguration by the Duke of Connaught of a memorial arch and gates to perpetuate the memory of the Royal Dublin Fusiliers who fell in South Africa took place. The arch is built of Irish white granite from the famous Ballynocken Quarries, County Wicklow, with limestone panels from the Sheephouse Quarries, Drogheda. The height of the memorial is 32 ft. 6 in., and the breadth 27 ft. 3 in. On either side of it are gates, the whole occupying a frontage of about 86 ft. Mr. Howard Pentland, R.H.A., Architect of the Board of Works, in conference with Sir Thomas Drew, P.R.H.A., designed the arch. The contractors were Messrs. Laverty, Ltd., of Belfast and Dublin.

ROAD IMPROVEMENTS, ETC., IN THE HANDSWORTH DISTRICT.—Mr. H. Richardson, in his report to the Handsworth Urban District Council on the work of the Surveyor's department during the year ended March 31 last, states that, acting on the instructions of the Highway Committee, he had taken each opportunity that had offered to bring before the committee's notice any likely public street improvements which could be carried out at a reasonable cost. No addition had been made to the main roads, which are repairable at the expense of the Staffordshire County Council. In reference to dust prevention, Mr. Richardson expresses the opinion that even with improved methods of road construction, such as tar-macadam, the dust nuisance, although greatly minimised, will still be apparent, though it is in this direction that the greatest relief will be obtained.

SCAFFOLDING DANGERS.—Dr. Danford Thomas held an inquest on the 23rd inst., at the Marylebone Coroner's Court, concerning the death of Michael Hennessey, 46, a plasterer, living in Earl-street, Edgware-road, who met with an accident on the previous Tuesday while engaged on decorative work at Frascati's Restaurant. Joseph Hodson, a plasterer, said he was working with the deceased and six others on the day of the accident. They were engaged on a scaffold decorating a ceiling. Contrary to custom, there was not a guard-pole to the scaffold. The workmen pointed out this omission to the scaffolder the first thing on Tuesday morning, and the reply was that he had used all the poles he had at his disposal. The men, however, went on working, and shortly after the dinner-hour the deceased, in apparently stepping back, fell backwards over the edge of the scaffolding, falling nine feet, and alighting on a table. He was picked up insensible, and conveyed to the Middlesex Hospital, but death appeared to have taken place before he was removed from the restaurant. In reply to the coroner the witness said the men did not complain to any higher authority than the scaffolder of the absence of the guard-pole. Dr. C. Morson said the cause of death was fracture of the spinal column. Henry Edwards, scaffolder, in the employment of Messrs. Godson & Sons, contractors, Kilburn, said he erected the scaffold from which the deceased fell, and had been in the employment of his firm fourteen years. He had put up four scaffolds at the Frascati, and none of them had guard-poles. They were not necessary, in his opinion. He admitted that a man shouted to him on the morning of the accident that there was no guard-rail, but denied that his reply was that he had no poles available. What he said was that no guard-rail was necessary. John May, general foreman to Messrs. Godson, said the scaffolding was properly erected, and in his opinion there was no necessity for a guard-pole. He had never in fact seen a guard-pole round the front of a scaffold, only at the ends where a man was likely to walk off. Similar evidence having been given by Mr. G. F. Godson, of the firm of contractors, Mr. Thatcher, Home Office Inspector, said he had examined the scaffold and found it reasonably safe, though rather "springy." In his opinion there should undoubtedly have been a guard-pole round the scaffold. Guard-poles were constantly used, though this was not rendered compulsory by Act of Parliament. The witness, however, thought that within a year or so an Act would be passed making it compulsory, as the result of the deliberations of a committee sitting at the Home Office. The jury returned a verdict of "Accidental death," and added as a rider that in their opinion a guard-pole should have been used, and that they approved of legislation making the use of such precautions compulsory.

VICTORIA AND ALBERT MUSEUM, SOUTH KENSINGTON.—The Board of Education have decided that from January 1, 1908, the museum shall be open free till 10 p.m. on Thursdays, instead of Tuesdays as at present.

Legal.

SHEFFIELD RIGHT OF WAY CASE.

IN the Vacation Court on Wednesday the case of the Attorney-General *v.* the Hippodrome (Sheffield), Ltd., was mentioned to Mr. Justice Pickford. (The case was reported in last week's issue of the *Builder*.)

Mr. Bramwell Davis, K.C., on behalf of the plaintiff, said that the action was brought to restrain the obstruction of an alleged public right of way. The defendants were prepared to give an undertaking to keep open the footway from end to end, and not to obstruct the plaintiff's door until the trial of the action or further order. In these circumstances he asked that no order should be made on the motion except that the costs should be made costs in the action.

Mr. Ashton Cross, who represented the defendants, consented to this arrangement.

His Lordship assented to the application.

NUISANCE FROM BURNING BRICKS.

THE case of Hextall *v.* Heddington Sand Pits Company came before Mr. Justice Pickford in the Vacation Court on Wednesday, on a motion by the plaintiff for an interim injunction to restrain the defendants from burning bricks so as to cause a nuisance to the plaintiff.

Upon the case being called on, counsel stated that the parties had come to a settlement and had agreed to treat the motion as the trial of the action, the defendants consenting to an injunction in the terms of the writ and to pay the plaintiff's costs of the proceedings.

His Lordship assented to this arrangement.

Patents of the Week.

APPLICATIONS PUBLISHED.*

17,339A of 1906.—R. E. ATKINSON: *Divided Single Pipe Heating or Radiator Systems.*

This relates to a heating or radiator system wherein a valve controlled opening or openings is or are formed between the flow side and the return side of the service pipes.

17,415 of 1906.—D. DORE and A. YOUNG: *Self-closing Gates or Doors.*

This relates to an expanding self-closing gate constructed with double uprights and expanding lattice in the usual way, but having springs inserted between the uprights so that the gate is automatically extended immediately upon being released from its collapsed position.

17,986 of 1906.—H. M. HARDY: *Fastenings for Sliding Windows and the like.*

This relates to a sash lock having a rocking pawl with a tooth on its upper end which engages with a rack in the window-sash, and consists in forming the lower end of the pawl with an opening so shaped as to receive the supporting pivot and the operating cam.

19,830 of 1906.—P. H. CONSTANTINE and T. G. KAY: *Window Frames and Means for Securing the Windows therein.*

This relates to windows and window frames, and more especially to that class wherein the windows are mounted on pivotal bearings situated to receive the axial pins, for allowing the window to rotate in the horizontal plane while its axis is in the vertical plane, and consists in providing hinged holding pieces or covers arranged to cover openings between the windows and their frames and retain said windows in position on one side, together with projecting flanges carried by said windows and their frames for covering the openings on the other side thereof.

20,861 of 1906.—A. BEDFORD: *Collapsible Gates.*

This relates to a collapsible gate in which a combined washer and slide is used for guiding and keeping in position the lattice-bars in the uprights, which can be stamped in wrought-iron or steel, or can be made in cast-iron, malleable iron, brass, or any other alloy, and consists of an oval-shaped washer with two long flange ends made of a size to suit any channel iron used in the making of collapsible gates. Two of these washers connected together by means of a pin form a movable and sliding joint for the lattice of the gate.

21,707 of 1906.—C. A. JACKSON: *Pulley Sheaves or Blocks.*

This relates to pulley sheaves or blocks fitted with a central sleeve formed with a series of holes in combination with an annular chamber to contain oil or lubricant and a series of projecting ribs for agitating the lubricant.

23,912 of 1906.—J. ORTON: *Casement Stays.*

This relates to a casement stay wherein the bar is secured to the attachment plate by a vertical wire, staple, or loop, and consists in providing said staple with an integral collar or projection adapted to extend beneath said bar, and to prevent same falling below the horizontal.

24,498 of 1906.—F. H. WILDGOOSE and J. READER: *Pipe Wrenches.*

This relates to pipe wrenches with a hand lever, having at one end an outwardly curved portion which forms the fixed jaw of the wrench; on the lever near the base of the jaw is pivoted a short arm, the outer or free end of which is formed with a sideway projecting portion, which forms the operative portion of the movable jaw of the wrench. The inner end of the arm is formed to pass across opposite faces of the lever, and is pivoted to the lever by a pivot pin. The movable jaw is shaped with the shank or pivoted portion at right angles to the head, forming an

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

PATENTS.—*Continued on page 255.*

List of Competitions, Contracts, etc.

For some Contracts still open, but not included in this List, see previous issues. Those with an asterisk (*) are advertised in this Number: Competitions, iv.; Contracts, iv. vi. viii. x.; Public Appointments, xvii.; Auction Sales, xxviii.

Certain conditions, beyond those given in the following information, are imposed in some cases, such as: the advertisers do not bind themselves to accept the lowest or any tender; that a fair wages clause shall be observed; that no allowance will be made for tenders; and that deposits are returned on receipt of a bonâ-fide tender unless stated to the contrary.

The date given at the commencement of each paragraph is the latest date when the tender, or the names of those willing to submit tenders, may be sent in.

*** It must be understood that the following paragraphs are printed as news, and not as advertisements: and that while every endeavour is made to ensure accuracy, we cannot be responsible for errors that *may* occur.

Competitions.

SEPTEMBER 18.—**Mullingar.**—DRAINAGE.—Mullingar R.D.C. invite the submission of plans, estimates, and specifications for a main drainage system for the town of Mullingar, and are prepared to award a premium of 50*l.* for the best and most suitable sent in. Copy of the conditions of the competition and instructions to competitors can be obtained on application by letter to Mr. Laurence Gavin, Clerk of Mullingar R.D.C.

OCTOBER 15.—**Cemaes.**—DRAINAGE.—The Twrcelyn R.D.C. invite plans and specifications, in competition, for a drainage scheme for the village of Cemaes. Although a drainage scheme for the whole of the village is asked for, it is understood that that portion of the scheme relating to the developed portion of the village only will be proceeded with. Competitors are requested to state the remuneration required by them for the plans, specifications, and supervision of the work. Mr. Thomas Hughes, Clerk to the Twrcelyn R.D.C., Brynaethwy, Menai Bridge.

Contracts.

BUILDING.

SEPTEMBER 2.—**Blackhall.**—SCHOOL.—Cramond School Board invite tenders for the mason, joiner, slater, plumber, plaster, smith, and heating work of a new school to be erected at Blackhall. Contractors wishing to tender will receive schedules from Mr. John Watson, F.R.I.B.A., 24, Castle-street, Edinburgh. Plans may be seen, and schedules of measurement obtained, at the office of the architect.

SEPTEMBER 2.—**Bradford.**—MOVABLE FLOOR.—Bradford Corporation invite tenders for the work required to be done in forming movable floor over the swimming pond at the Leeds-road District Baths. Drawings and general conditions of contract may be seen, and bill of quantities and form of tender obtained, on application to the City Architect, Whitaker-buildings, Brewery-street, Bradford.

SEPTEMBER 2.—**Bundoran.**—ORPHANAGE.—The erection of a male orphanage at Bundoran. Drawings and specifications may be inspected, and bills of quantities obtained, from Mr. William A. Scott, A.R.I.B.A., architect, 45, Mountjoy-square, Dublin.

SEPTEMBER 2.—**Cove.**—SCHOOL ADDITIONS.—Nigg School Board invite estimates for the mason, carpenter, slater, plaster, plumber, and painter and glazier works of proposed alterations on, and addition to, Cove Public School. Plans and specifications may be seen at the school house, or with Mr. Geo. Bennett Mitchell, architect, 148, Union-street, Aberdeen.

SEPTEMBER 2.—**Porthcawl.**—SANITARY CONVENIENCE.—Porthcawl U.D.C. invite tenders for a public sanitary convenience at John-street, Porthcawl. Plans and specification may be inspected at the Council Offices, Porthcawl, by appointment with Mr. R. W. Jones, the Council's Surveyor. Forms of tender and bills of quantities may be obtained on payment of 1*l.* 1s.

SEPTEMBER 4.—**Beverley.**—ALTERATIONS TO HOUSE.—Alterations to Norwood House, Beverley, by the Governors of the Beverley High School for Girls. Plans and specifications may be seen, and quantities obtained, at the office of Mr. B. S. Jacobs, F.R.I.B.A., Lincoln's Inn-buildings, Bowalley-lane, Hull.

SEPTEMBER 4.—**Golcar.**—MISTAL.—The various trades required in the erection of an eight-stall mistal at Drummer-lane Farm, Golcar. Plans may be seen, and quantities obtained, at office of Mr. Arthur Shaw, architect, Golcar

SEPTEMBER 4.—**Plymouth.**—PROPOSED PUBLIC LIBRARY, MUSEUM, AND ART GALLERY.—Names to the architects, Messrs. Thornley & Rooke, No. 11, The Crescent, Plymouth.

SEPTEMBER 4.—**Pyle.**—COTTAGES.—The erection of fifty cottages at Kenfig Hill, near Pyle, for the First Kenfig Hill Building Club. Plans and specification may be seen at the office of the architect, Mr. Thomas Gibb, Post-office-chambers, Port Talbot.

SEPTEMBER 3.—**Rathdown.**—ROOM.—Rathdown No. 1 R.D.C. invite tenders for building an additional room to a labourer's cottage in the townland of Dean's Grange, close by main road from Dublin to Bray. Plan and specification prepared by Mr. R. M. Butler, A.M.Inst.C.E., 12, Dawson-street, Dublin, can be seen at the Clerk's office, Loughlinstown.

SEPTEMBER 5.—**Blackley.**—WATER TOWER.—Prestwick Guardians invite tenders for the erection of a water tower at their new infirmary in Charlestown-road, Blackley, Manchester. Mr. Edward W. Ogden, Clerk to the Guardians, Union Offices, Cheetham Hill-road, Manchester.

SEPTEMBER 5.—**Monaghan.**—POST-OFFICE.—The Board of Public Works, Ireland, invite tenders for the erection and completion of a new Crown Post-office at Monaghan, Co. Monaghan. The plans and specification can be seen at the office of Messrs. W. H. Stephens & Sons, surveyors, 13, Donegall-square N., Belfast, by whom forms of tender and bills of quantities will be supplied on deposit with them of 1*l.*

SEPTEMBER 5.—**Rothes.**—COTTAGE.—The mason, carpenter, slater, plaster, and painter work of gamekeeper's cottage, at Doonie Hall, Rothes (Seafield Estates). Plans and specifications may be seen at Estate Office, Rothes.

SEPTEMBER 5.—**Southchurch.**—SHELTERS.—Southend-on-Sea Corporation invite tenders for the provision and erection of shelters on Southchurch Parade. Plans, sections, and conditions may be seen, and specifications and forms of tender obtained (on deposit of cheque for 1*l.* 1s.), upon application to Mr. E. J. Elford, M.Inst.M.E., Borough Engineer.

SEPTEMBER 6.—**Richmond.**—WALLS, ETC.—Richmond (Surrey) T.C. invite tenders for boundary walls and iron fencing at proposed recreation ground, North Sheen. Drawings and general conditions of contract may be seen, and all particulars obtained, on application to Mr. J. H. Brierley, Borough Surveyor, Town Hall, Richmond, Surrey, where also a form of tender, together with a copy of the bill of quantities and specification, may be obtained on payment of a deposit of 1*l.* 1s.

* SEPTEMBER 7.—**Edinburgh.**—MACHINERY HALL.—The Committee of the Scottish National Exhibition invite tenders for the erection of the machinery hall at Saughton Park for the exhibition of 1908. For further particulars refer to an advertisement in this issue

SEPTEMBER 7.—**Mumbles.**—ALTERATIONS, ETC., TO POLICE-STATION.—Glamorgan Quarter Sessions and C.C. Standing Joint Committee invite tenders for certain alterations and additions at the Mumbles Police-station. A plan of the work required can be seen, and copies of the specification, bill of quantities, and form of tender obtained, at offices of Mr. T. Mansel Franklen, Clerk of the Glamorgan C.C., Glamorgan C.C. Offices, Westgate-street, Cardiff, and at the police-station, Mumbles.

SEPTEMBER 7.—**Whitchurch.**—POLICE-STATION.—Glamorgan Quarter Sessions and C.C. Standing Joint Committee invite tenders for the erection of a new police-station at Whitchurch. Plans and specification of the works required can be seen, and copies of the bill of quantities and form of tender obtained, at offices of Mr. T. Mansel Franklen, Clerk of the Glamorgan C.C., Glamorgan C.C. Offices, Westgate-street, Cardiff.

SEPTEMBER 9.—**Bedfield.**—SCHOOL ENLARGEMENT.—The Managers invite tenders for the enlargement of Bedfield Voluntary School. The drawings and specifications can be seen on application to Mr. Charles Ling, Bedfield.

* SEPTEMBER 9.—**Coventry.**—GASWORKS.—The Gas Committee of the Coventry Corporation invite tenders for the erection of buildings at the Foleshill works. For further particulars see advertisement in this issue.

SEPTEMBER 9.—**North Shields.**—POLICE-STATION.—Tynemouth Corporation invite tenders for the erection and completion of the proposed West End Police-station, Lawson-street, North Shields. Plans, etc., may be seen at the office of Mr. John F. Smillie, Borough Surveyor, Tynemouth, where copies of the bills of quantities and general conditions may be obtained on payment of 2*l.* 2s.

SEPTEMBER 10.—**Omagh.**—ENLARGEMENT OF MANSE.—Tenders will be received by the Committee of Seskinore Presbyterian Church, Omagh, for the enlargement and improvement of the Manse. Plan and specification can be seen with Rev. W. J. M'Askie, B.A., Manse, Seskinore, Omagh. Mr. James Young, Secretary of Committee.

SEPTEMBER 10.—**Rowley Regis.**—PARTITION AND ALTERATIONS.—Rowley Regis U.D.C. invite tenders for providing and fixing a swivel partition and for alterations at the boys' department, Old Hill Macefields Council School. Plans and specifications may be seen at the Council Offices, Old Hill.

SEPTEMBER 10.—**Swalwell.**—PREMISES.—The Swalwell Co-operative Society, Ltd., invite tenders for the alteration of existing premises and erection of new shop, warehouses, etc., at Market-lane, Swalwell. Plans and specification can be seen upon deposit of 1*l.* 1s. at the offices of the Society.

SEPTEMBER 11.—**Exeter.**—LACE ROOMS.—A block of lace-mending rooms, caretaker's rooms, and offices adjoining, at Buller-road, St. Thomas, Exeter, for Messrs. J. Heathcoat & Co., of Tiverton. Plans and specifications can be seen at Messrs. Stuckey's Banking Company, High-street, Exeter.

SEPTEMBER 12.—**Ludlow.**—RECEIVING WARD, ETC.—Ludlow Guardians invite tenders for the erection of receiving ward, Nurses' rooms, laundry, heating chamber, hot-water apparatus, etc., at the Workhouse. Specifications, plans, general conditions, and form of tender may be obtained from the architect, Mr. John Butters, Railway Station, Ludlow, upon application to him, and on payment of 2*l.*

* SEPTEMBER 14.—**Smallthorne.**—SCHOOL EXTENSION.—The Staffordshire Education Committee invite tenders for proposed additions at Bradeley Council School, Smallthorne. For further particulars refer to an advertisement in this issue.

SEPTEMBER 14-27.—**Yardley.**—SCHOOL.—Worcestershire Education Committee invite tenders for the erection of schools at Acock's Green, Yardley. Applications for forms of tender and bills of quantities may be made at the offices of the surveyor, Mr. George Kenwrick, F.S.I., 83, Colmore-row, Birmingham. Before obtaining the bills of quantities it will be necessary to deposit a sum of 3*l.* 3s. The drawings may be seen on and after the same date at the offices of the architect, Mr. A. B. Rowe, Worcester Chambers, Pierpoint-street, Worcester.

* SEPTEMBER 16.—**Surrey.**—TECHNICAL INSTITUTE.—The Surrey Education Committee invite tenders for the erection of a new technical institute at Guildford, Surrey. For further particulars see advertisement in this issue.

* SEPTEMBER 17.—**London.**—WORKSHOP (ROYAL MINT).—The Commissioners of H.M. Works and Public Buildings invite tenders for the erection of a mechanics' workshop at the Royal Mint. For further particulars refer to an advertisement in this issue.

* SEPTEMBER 18.—**Coventry.**—NEW SCHOOL.—The Corporation of Coventry invite tenders for a new public elementary school at Leicester Causeway, in the city of Coventry. For further particulars refer to an advertisement in this issue.

* SEPTEMBER 18.—**London, S.E.**—UNDERGROUND CONVENIENCE.—The Southwark B.C. invite tenders for an underground convenience for women on the Island at the Elephant Headway. For further particulars refer to an advertisement in this issue.

SEPTEMBER 19.—**Scunthorpe.**—SCHOOL, ETC.—Lindsey C.C. Education Committee invite tenders for the erection of a higher elementary school and pupil teachers' centre at Scunthorpe. Bills of quantities and form of tender may be had on application to Messrs. Scorer & Gamble, architects, Bank-street-chambers, Lincoln. The drawings and the conditions of contract may be inspected at the offices of the architects on payment to them of 3*l.* 3s.

* SEPTEMBER 24.—**Hounslow.**—NEW SCHOOLS.—The Heston and Isleworth Urban District Education Committee invite tenders for new schools at Hounslow Heath. For further particulars refer to an advertisement in this issue.

* SEPTEMBER 25.—**Watford.**—NEW SCHOOL.—The Hertfordshire C.C. Education Committee invite tenders for the erection and completion of a new school for 960 children. For further particulars refer to an advertisement in this issue.

OCTOBER 1.—**Feenagh.**—ALTAR.—Designs, specifications, and estimates will be received by the Rev. Thomas Liston, P.P., on or before October 1 for supplying and erecting a marble altar, including foundations, at Feenagh Roman Catholic Church, Co. Limerick. Specifications, conditions, and particulars will be supplied by Mr. James D. Leahy, architect, Newcastle West, on payment of a fee of 1*l.* 1s.

ENGINEERING, IRON, AND STEEL.

SEPTEMBER 2.—**Bradford.**—MOVABLE FLOOR.—Bradford Corporation invite tenders for the work required to be done in forming movable floor over the swimming pond at the Leeds-road District Baths. Drawings and general conditions of contract may be seen, and bill of quantities and form of tender obtained, on application to the City Architect, Whitaker-buildings, Brewery-street, Bradford.

SEPTEMBER 2.—**Edinburgh.**—FENCING MANHOLES.—The Edinburgh and District Water Trustees invite tenders for providing and erecting wrought-iron bar fencing round manholes on the aqueduct between Talla Reservoir and Edinburgh. Plans may be seen, and copies of the specification and schedule obtained, at the office of the engineer, Mr. W. A. Tait, C.E., 72A, George-street, Edinburgh, on payment of 1*l.*

SEPTEMBER 2.—**Edinburgh.**—CAST-IRON PIPES.—Edinburgh and District Water Trust invite tenders for supplying about 155 tons of cast-iron pipes, 16 in. in diameter. The drawings may be seen, and copies of specification and form of tender obtained, at the Superintendent of Works' Office, No. 12, St. Giles-street, Edinburgh.

SEPTEMBER 3.—**Aston.**—HEATING.—Aston Guardians invite tenders to provide and fix heating apparatus and to extend a hot-water supply apparatus in the new wing of the No. 2 North Pavilion of the Workhouse at Gravelly Hill. Plans and specification may be seen on application to the Master at the Workhouse, or at the office of the architects, Messrs. C. Whitwell & Son, 3, Newhall-street, Birmingham.

SEPTEMBER 3.—**London.**—ROLLING STOCK.—The South Indian Railway Company, Ltd., invite tenders for the supply of:—(1) Rolling stock—126 carriage underframes, with bogies and vacuum brake complete: (2) wheels and axles—504 pairs; (3) laminated and ellip-

tical springs—2,520. Specifications and forms of tender may be obtained at the Company's Offices, 55, Gracechurch-street, London. A charge, which will not be returned, will be made of 20s. for each copy of specification No. 1, and 10s. for each copy of Nos. 2 and 3. Copies of the drawings may be obtained at the office of Sir George B. Bruce, 3, Victoria-street, Westminster, on payment of 5s. per sheet.

SEPTEMBER 5.—**Whiston.**—HEATING APPARATUS.—Prescot Guardians invite tenders for hot-water apparatus for inmates' workshops, at the Whiston Workhouse. Plans and specifications may be seen at the offices of Mr. James Gandy, architect, Masonic Buildings, St. Helens, and particulars may be obtained on a deposit of 10s.

SEPTEMBER 7.—**North Shields.**—WORK AT QUAYS.—Tynemouth Corporation invite prices for providing and fixing close timber sheeting below the deck of the foreshore jetty. Drawings and specifications may be seen, and forms of tender, with schedule for prices, obtained, at the office of Mr. John F. Smillie, Borough Surveyor, Tynemouth.

SEPTEMBER 9.—**Manchester.**—PIPES.—Manchester Corporation Waterworks Committee invite tenders for the supply of about 13,000 tons of cast-iron pipes and special castings, 44 in. diameter. Specification and form of tender may be obtained on application to Messrs. G. H. Hill & Sons, civil engineers, Albert Chambers, Albert-square, Manchester, and 3, Victoria-street, Westminster, upon receipt of cheque for 2*l.* 2s.

SEPTEMBER 13.—**Wadsley.**—FIRE-ESCAPE STAIRCASES.—West Riding C.C. Wadsley Asylum Sub-Committee invite tenders for the erection of two iron fire-escape staircases required at this institution. Plans may be seen, and all particulars obtained, on application to the Clerk of Works, Mr. J. W. Cotterill, Wadsley Asylum, near Sheffield.

SEPTEMBER 18.—**Leeds.**—SEWAGE SLUDGE PRESSES.—Leeds Sewerage Committee invite tenders for the supply, delivery, and erection of an installation of sewage sludge filter presses, together with other incidental machinery connected therewith, at Sewage Works, Knostrop, Leeds. A specification of requirements, together with copies of drawings explaining the same, may be obtained on application at the office of the Sewerage Engineer, Municipal Buildings, Leeds.

* SEPTEMBER 18.—**London, S.E.**—WELL-SINKING.—The Southwark B.C. invite tenders for sinking a well and providing and fixing pumping plant at the Public Baths, Manor-place, Walworth-road, S.E. For further particulars refer to an advertisement in this issue.

OCTOBER 1.—**Maidstone.**—SEWAGE PUMPING PLANT.—The Corporation of Maidstone invite tenders for the supply and erection of four electrical motors and centrifugal pumps, also three electrical motors and centrifugal pumps. Plans and sections of the proposed works may be seen, and specifications and bill of particulars, together with a form of tender, may be obtained on application to Mr. G. R. Strachan, M.Inst.C.E., 9, Victoria-street, Westminster, London, on payment of a deposit of 3*l.* 3s. by cheque.

OCTOBER 19.—**Canton, China.**—BRIDGE.—The Canton River Bridge Company, Ltd., invite sealed tenders for the construction and erection of a steel cantilever and girder bridge in the front reach, Canton. The general conditions, specifications, drawings, form of tender, and all other information may be obtained at the offices of Mr. William Danby, M.Inst.C.E., Hongkong and Canton, or at the following agencies of the Chartered Bank of India, Australia, and China, viz., London, Paris, Hamburg, or New York.

OCTOBER 31.—**Rangoon.**—PUMPING PLANT.—Rangoon Municipality invite sealed tenders for pumping plant, in duplicate, to raise up to a maximum of 10,000 galls. of water per minute to a height, including suction-lift and friction, of 220ft. Full particulars can be obtained on application to Messrs. Ogilvy, Gillanders, & Co., London agents to the Rangoon Municipality, Sun-court, 67, Cornhill, London, E.C., accompanied by a remittance of 10s., which will not be returned.

MISCELLANEOUS.

SEPTEMBER 3.—**Leyton.**—SCAVENGING.—Leyton U.D.C. invite tenders for the collection of house refuse by the pail system from houses within their district. Forms of tender and further particulars can be obtained of Mr. William Dawson, M.Inst.C.E., the Council's Surveyor, Town Hall, Leyton.

SEPTEMBER 4.—**Dartford.**—FIRE ALARM AND TELEPHONE SYSTEM.—The Metropolitan Asylums Board invite tenders for alterations and additions to fire alarm and telephone systems at the Gore Farm Hospitals, near Dartford, Kent, in accordance with drawings and specification prepared by Mr. W. T. Hatch, M.Inst.C.E., M.Inst.M.E., Engineer-in-Chief. Drawings, specification, conditions of contract, and form of tender may be inspected at the office of the Board, Embankment, London, E.C., and can then be obtained upon payment of a deposit of 2*l.*

SEPTEMBER 4.—**Ratndown.**—DRYING HORSES.—Rathdown Guardians invite tenders for works to be done in providing and fixing new drying horses in the laundry of the Workhouse, also to repair ceiling of drying room, etc., in accordance with the terms of plan and specification prepared by Mr. George T. Moore, A.M.Inst.C.E., which can be seen at the Clerk's office, Loughlinstown.

SEPTEMBER 5.—**Blaydon.**—SCAVENGING.—Blaydon U.D.C. invite tenders for the removal and disposal of contents of ashpits, house refuse, etc., at Victoria Garesfield. Specification, form of tender, and full particulars may be obtained from Mr. Robert Biggins, Sanitary Inspector, at the Offices of the Council, Blaydon-on-Tyne.

SEPTEMBER 5.—**Swinton.**—WIRING.—Swinton and Pendlebury U.D.C. invite tenders for wiring the following public buildings for electric lighting:—Council Offices, Swinton; Public Baths, Swinton; Town Hall, Pendlebury. Specifications and plans may be obtained from Mr. W. T. Postlethwaite, Clerk to the Council, Council Offices, Swinton, Manchester, on payment of 10s.

SEPTEMBER 9.—**Ryton.**—CARTAGE.—The U.D.C. of Ryton invite tenders for the cartage of road metal from Blaydon Station or Quay, Addison or Emma Colliery siding, Clara Vale Colliery siding, and Wylam Station to the different parts of their district. Particulars may be obtained on application to Mr. John P. Dalton, surveyor, Ryton-on-Tyne.

SEPTEMBER 11.—**Dorset.**—STEAM ROLLING.—The C.C. of Dorset invite tenders for steam rolling and scarifying, etc., the rural main roads of the county for the year ending March 31, 1908. Specification and forms of tenders and any further particulars can be obtained from Mr. Walter J. Fletcher, County Surveyor's Office, Wimborne, Dorset.

SEPTEMBER 13.—**London.**—MANHOLE COVERS.—The Receiver-General and Director of Contracts, Valletta, invites tenders for the supply of manhole covers. Tenders are to be accompanied with a deposit of 30*l.* Particulars, specification, etc., may be obtained on application at office of Mr. Jos. Huber, Acting Receiver-General and Director of Contracts, or to the Crown Agents for the Colonies, Whitehall-gardens, London.

SEPTEMBER 14.—**Cardiff.**—TELEPHONES.—Cardiff Guardians invite tenders for provision of telephones, necessary wiring, switchboard, etc., and alteration of present telephone service at their cardiff and Ely Workhouses. Particulars and form of tender may be obtained from Mr. Arthur J. Harris, Clerk, Union Offices, Queen's-chambers, Cardiff.

SEPTEMBER 14.—**Dartford.**—TIMBER.—Dartford Guardians invite tenders for the supply (at per fathom) of about 100 fathoms of best Baltic yellow deal and batten ends for the purpose of splitting for firewood. Mr. J. C. Hayward, Clerk, Union Offices, Dartford.

SEPTEMBER 16.—**Keady.**—SIGNALLING.—Castleblayney, Keady, and Armagh Railway Company Directors invite tenders for the signalling (about fourteen working levers) of the new station at Keady, in accordance with the plan and specification to be seen at the office of Mr. W. H. Mills, Engineer-in-Chief, Great Northern Railway Company (Ireland), Amiens-street Terminus, Dublin.

NO DATE.—**Great Yarmouth.**—BREYDON WALL REPAIR.—Repairs of the Breydon Wall. Plans and specifications and further information at office of Mr. James E. Teasdel, engineer and surveyor, 3, Queen-street, Great Yarmouth; also of Mr. H. P. Frederick, the Clerk to the Burgh Castle, Southtown, and Cobholm Island Drainage Board, No. 3, South-quay, Great Yarmouth.

PAINTING, etc.

SEPTEMBER 3.—**New Malden.**—PAINTING.—Maldens and Coombe U.D.C. invite tenders for painting the external wood and iron work at the Council Offices, etc., New Malden. Specification of the work required to be done can be seen at the office of the Engineer and Surveyor to the Council, Mr. T. B. Simmons, Council Offices, New Malden.

SEPTEMBER 4.—**Dublin.**—PAINTING.—South Dublin Board of Guardians invite tenders for the painting of the Roman Catholic Church at Kilmainham, in accordance with specification prepared by the Clerk of Works. Any information required will be supplied on application to the Master of the Workhouse.

SEPTEMBER 4.—**Harrogate.**—PAINTING.—The Committee of Management of the Royal Bath Hospital and Rawson Convalescent Home, Harrogate, invite tenders for the painting of the wood and iron work on the outside of these institutions. Specifications of work required may be seen daily from 1 to 4 p.m. at the Hospital.

SEPTEMBER 4.—**Kilmainham.**—PAINTING.—South Dublin Guardians invite tenders for the painting of the Roman Catholic Church at Kilmainham, in accordance with specification prepared by the Clerk of Works. Any information required will be supplied on application to the Master of the Workhouse.

SEPTEMBER 7.—**Bradford.**—PAINTING.—Bradford Education Committee invite tenders for the outside painting of several schools. Specifications and forms of tender may be obtained at the Education Office (Architect's Department).

SEPTEMBER 9.—**Hull.**—PAINTING.—Sculcoates Guardians invite tenders for painting, etc., on the exterior of the Workhouse premises (excluding the Infirmary), Beverley-road, Hull. Forms of tender and specification and all particulars may be obtained on application to the Guardians' Architect, Mr. T. B. Atkinson, M.S.A., 11, Trinity House-lane, Hull.

SEPTEMBER 16.—**Thornton Heath.**—PAINTING.—Croydon Guardians invite tenders for internal painting, etc., of part of the Infirmary buildings, Mayday-road, Thornton Heath, Surrey. The specification and conditions of contract may be seen, and bills of quantities and form of tender obtained, at the office of Mr. Henry Berney, architect, 104, George-street, Croydon, Surveyor to the Guardians, upon depositing the sum of 5*l.* 5s.

NO DATE.—**New Ferry.**—PAINTING.—Painting outsides of thirty houses in New Ferry. Apply Mr. Thompson, Egerton-road, New Ferry.

ROADS, SANITARY, AND WATER WORKS.

SEPTEMBER 3.—**Leigh-on-Sea.**—SEWERAGE WORKS.—The U.D.C. invite tenders for the various works required to be done and materials to be supplied in the laying and completing of 1,500 lin. yds., or thereabouts, of 9-in. diameter stoneware pipe sewer along London-road, Elm-road, and The Broadway. A form of tender and bill of quantities will be supplied on payment of 2*l.* 2s. deposit. Mr. John W. Liversedge, C.E., Engineer and Surveyor, Council Offices, Leigh-on-Sea, Essex.

SEPTEMBER 4.—**Dunfermline.**—CEMETERY EXTENSION.—The digger, draining, and enclosure walls and railings for extension of Beath Cemetery; also for building works in connexion with office and shelters. Plans to be seen, and schedule of measurements obtained, on application to Mr. John Houston, architect, Dunfermline.

SEPTEMBER 5.—**Southend-on-Sea.**—ROAD WORKS.—Southend-on-Sea Corporation invite tenders for the widening of the carriageway at Hamlet Court-road, between Canewdon-road and Leonard-road. Plans, sections, and specifications may be seen, and bills of quantities and forms of tender obtained (on deposit of cheque for 1*l.* 1s.), upon application to Mr. E. J. Elford, M.Inst.M.E., Borough Engineer.

SEPTEMBER 5.—**Southend-on-Sea.**—SEWERING.—Southend Corporation invite tenders for the sewering of Glen-road. Plans, sections, and specifications may be seen, and bills of quantities and forms of tender obtained (on deposit of cheque for 1*l.* 1s.), upon application to Mr. E. J. Elford, M.Inst.M.E., Borough Engineer.

SEPTEMBER 6.—**Richmond (Surrey).**—PRIVATE STREET WORKS.—Works in Beechwood-avenue and Burlington-avenue, Kew. Drawings and conditions of contracts may be seen, and all particulars obtained, on application to Mr. J. H. Brierley, Borough Surveyor, Town Hall, Richmond, Surrey, where also a form of tender, together with schedule, and a copy of the specification may be obtained, on payment of a deposit of 1*l.* 1s.

SEPTEMBER 6.—**Stansted.**—SEWAGE DISPOSAL WORKS.—Stansted R.D.C. invite tenders for the construction of a septic tank and filter bed with distributors on the sewage disposal site at Stansted. Drawings may be seen at office of Mr. Alfred G. Gwynn, Clerk to the Council, 29, North-street, Bishop's Stortford, and specification and further particulars obtained from Mr. E. T. Watts, surveyor, Thorley, Bishop's Stortford.

SEPTEMBER 6.—**Windsor.**—SEWER.—Tenders are invited for the construction of a drain from Clewer Court to the Maidenhead-road sewer. Particulars can be obtained, and plans, specification, and quantities inspected, at office of Messrs. Lovegrove & Durant, 4, Park-street, Windsor.

SEPTEMBER 7.—**Manchester.**—UNDERGROUND TELEPHONE PIPES.—Manchester Paving, Sewering, and Highways Committee invite tenders for laying underground telephone pipes (contract No. 15), with other appurtenant works. Drawings may be seen, and specification, bill of quantities, and form of tender obtained, on application at the City Surveyor's Office, Town Hall, Manchester, on payment to the City Treasurer of 2*l.* 2s. All cheques or postal orders are to be made payable to the order of "The Corporation of Manchester."

SEPTEMBER 7.—**Tynemouth.**—ROAD WORKS.—For the construction of the extension (some 200 yds. in length) of Queen Alexandra-road, North Shields. Drawings and specification may be seen at the offices of Mr. John F. Smillie, Borough Surveyor, Tynemouth.

SEPTEMBER 9.—**Eastleigh.**—SEWERS.—The U.D.C. of Eastleigh and Bishopstoke invite tenders for laying two short lengths of sewer in the district. Plans and specification may be seen, and bills of quantities obtained, upon paying a deposit of 2*l.* at the office of Mr. W. Wallace Gandy, Engineer and Surveyor to the Council, Council Offices, Eastleigh.

SEPTEMBER 9.—**Hounslow.**—ROAD WORKS.—Heston and Isleworth U.D.C. invite tenders for the following works:—(1) Wood paving with hardwood blocks about 562 sq. yds. of roadway at the junction of the Bath and Staines roads, Hounslow; (2) private street works at Standard-road, Hounslow; (3) private street works at Clare-road, Hounslow; (4) private street works at Cecil-road, Hounslow. The drawings, specification of works, and general conditions of contract may be seen, and bill of quantities, with forms of tender, obtained from Mr. John George Carey, Engineer and Surveyor to the Council, Council House, Hounslow, upon payment of 1*l.* 1s. for each section.

SEPTEMBER 11.—**Belper.**—SEWAGE WORKS.—Belper U.D.C. invite tenders for certain additional works of sewage disposal proposed to be carried out within their district, comprising storm-water filter-beds, engine-house, ejector stations, etc. Plans, sections, and detail drawings may be seen, and specifications and bills of quantities obtained, on the payment of a deposit of 3*l.* 3s., at the offices of the engineer, Mr. Charles J. Lomax, A.M.Inst.C.E., 37, Cross-street, Manchester.

SEPTEMBER 11.—**Farnworth.**—SEWAGE WORKS.—Farnworth U.D.C. invite tenders for the construction of extensions at the Hall-lane Sewage Outfall, consisting of bacteria beds, sludge drying beds, and other appurtenant works. Drawings may be seen at the offices of the engineer, Mr. W. J. Lomax, A.M.Inst.C.E., No. 11, Fold-street, Bolton, from whom bills of quantities, specifications, and forms of tender may be obtained on deposit of 5*l.*

SEPTEMBER 11.—**Milford.**—SEWERAGE WORKS.—Belper R.D.C. invite tenders for works of sewerage within the rural district of Milford, near Belper. Plans, sections, and detail drawings may be seen, and specifications and bills of quantities obtained, on the payment of a deposit of 3*l.* 3s., at the offices of the engineer, Mr. Charles J. Lomax, A.M.Inst.C.E., 37, Cross-street, Manchester.

SEPTEMBER 12.—**Norley.**—WATER SUPPLY.—The R.D.C. of Runcorn invite tenders for the supply, delivery, and laying of about 11,000 yds. of 3-in. water mains, with valves and hydrants, in the Parish of Norley. Plans, specifications, etc., may be seen at the Offices of the Council, 71, High-street, Runcorn, after August 27. Specification can be obtained on payment of 1*l.* 1s.

SEPTEMBER 16.—**London.**—REPAVING.—Bermondsey B.C. invites tenders for the repaving of Crucifix-lane with granite setts. Plans and specification may be seen, and forms of tender obtained, on application to Mr. R. J. Angel, M.Inst.C.E., Borough Surveyor.

SEPTEMBER 17.—**Croydon.**—STREET WORKS.—Croydon B.C. invite tenders for the repair of Courtney-place. Plans and specification of the required works may be seen, and forms of tender obtained, on application at the Borough Road Surveyor's office, Town Hall, Croydon.

STONE, MATERIALS, AND STORES.

SEPTEMBER 2.—**Durham.**—STORES.—Durham County Lunatic Asylum Visiting Committee invite tenders for supplying the Asylum with articles as may be

required during the half-year, commencing on October 1, 1907. Forms and conditions of tender may be had on application at the office of the Steward, at the Asylum.

SEPTEMBER 3.—**Poole.**—GRANITE.—Poole B.C. invite tenders for the supply of about 2,400 tons of granite. Forms of tender and any other particulars may be obtained on application to the Borough Surveyor.

SEPTEMBER 4.—**London.**—STORES.—The East Indian Railway Company invite tenders for the supply and delivery of:—(1) Mild steel plates and bars; (2) panel plates; (3) brass tubes; (4) copper plates and rods; (5) crank and straight axles for locomotives; (6) helical and volute springs; (7) light draught paddle steamers, as per specifications to be seen at the Company's offices, Nicholas-lane, London, E.C. Tenders are to be sent not later than 12 o'clock noon, for Nos. 1 to 4 on September 4, for Nos. 5 to 6 on September 11, and for No. 7 on September 18.

SEPTEMBER 5.—**Bradford.**—PRESS PACKING MATERIALS.—The Bradford Corporation invite tenders for the supply of the following materials required at the Conditioning House, viz.:—Patent packing, canvas, bagging, oilcloth, packing mats, packing boards, slipper studs, and iron hoops. Forms of tender, with any further information required, may be had on application to the Manager at the Corporation Conditioning House, Bradford, where samples may be seen.

SEPTEMBER 5.—**Falkirk.**—STORES.—The Directors of Cross' Chemical Company, Ltd., invite tenders for the supply of stores for their Camelon Works, Falkirk. The various requirements comprise bolts, nuts, steam and gas pipes, nails, iron barrows, oils, shovels, picks, rubber, asbestos, etc. Complete schedules can be obtained on application to Mr. Thos. Thornley, Camelon Works, Falkirk.

SEPTEMBER 7.—**South Shields.**—MATERIALS.—South Shields Corporation invite tenders for the supply of materials. Specifications and forms of tender may be had on application to Mr. S. E. Burgess, M.Inst.C.E., Borough Engineer and Surveyor, Chapter-row, South Shields.

SEPTEMBER 9.—**Manchester.**—PIPES AND CASTINGS.—Manchester Corporation Waterworks Committee invite tenders for the supply of about 13,000 tons of cast-iron pipes and special castings, 44 in. diameter. Specification and form of tender may be obtained on application to Messrs. G. H. Hill & Sons, civil engineers, Albert-chambers, Albert-square, Manchester, and 3, Victoria-street, Westminster, upon receipt of cheque for 2*l.* 2*s.*

SEPTEMBER 10.—**Hanwell.**—GRANITE.—Hanwell U.D.C. invite tenders for the supply of 1½-in. and 2-in. hand-broken Guernsey, Channel Islands, or Clee Hill granite for the period ending March 31, 1908. Forms of tender, contract, and sureties' bond can be inspected at the Council's Offices, between the hours of 10 a.m. and 5 p.m.

SEPTEMBER 12.—**Bradford.**—STORES.—Bradford Gas Committee invite tenders for the supply of stores. Forms of tender, with any further information required, may be had on application to Mr. Chas. Wood, Gas Engineer, Town Hall, and samples may be seen at Mill-street Gas Works.

SEPTEMBER 12.—**Whalley.**—BRICKS.—Lancashire Asylums Board invite tenders for the manufacture of the bricks which will be required for the erection of the new asylum at Whalley, near Blackburn, Lancashire, from the clay found on the site. Further particulars, including form of tender, with conditions and specification, may be obtained upon application to Mr. Harcourt E. Clare, Clerk to the Lancashire Asylums Board, County Offices, Preston, accompanied by a deposit of 2*l.*

SEPTEMBER 14.—**Tredegar.**—ROAD MATERIAL.—The U.D.C. of Tredegar invite tenders for the supply of about 2,000 tons of limestone. Samples to be sent to the Council's Surveyor, at Bedwellty House, Tredegar.

SEPTEMBER 16.—**Faversham.**—GRANITE.—Faversham Corporation invites tenders for the supply of 700 tons (more or less) of Guernsey granite, Rhenish basalt, or Ouenast, broken to a 2-in. gauge. Mr. Allan Tassell, Town Clerk, 20, West-street, Faversham.

Public Appointment.

Nature of Appointment.	By whom Advertised.	Salary.	Application to be in
*VARIOUS TEACHERS	London County Council	See advertisement in this issue	Sept. 16

Auction Sales.

Nature and Place of Sale.	By whom Offered.	Date of Sale.
*BRICKMAKING PLANT, SHOEBURYNESS—On the Premises	Fuller, Horsey, Sons, & Cassell	Sept. 17
*SLATE-SLABS—Oak Wharf, Millwall	Fuller, Horsey, Sons, & Cassell	do.
*QUARRY PLANT, MACHINERY, ETC., IRELAND—Doonagore, etc.	Matcham & Co.	Sept. 18
*ORLEANS HOUSE, TWICKENHAM—At the Mart	Marler & Marler	Oct. 7

PATENTS.—*Continued from page 252.*

L-shaped device. The gripping surfaces of the jaws are serrated or otherwise suitably roughened. When the wrench is to be used the movable jaw is moved back sufficiently from the fixed jaw to allow the jaws to be passed across the article which is to be turned, a slight movement of the lever while the moving jaw is pressed by hand then causing the jaws to grip tightly the article which is between them.

24,502 of 1906.—H. M. BUTLER: *Travelling Step-ladder with Elevating Platform.*

This relates to a step-ladder with an elevating platform, which can be raised on sliding supports, the said supports fitting into teeth cut in the front portion of the sides of the steps.

25,177 of 1906.—H. L. MINTER: *Taps.*

This relates to a tap wherein the delivery of fluid is controlled by means of a flat disc or valve that is provided with one or more ports and is rotatable upon a flat seating provided with a port or ports that communicate with the outlet orifice of the tap, and with which the ports in the valve can by the rotation thereof be brought into coincidence and in which is arranged a spring whereby the disc or valve is pressed against its seat and maintained in fluid-tight contact therewith during the passage of fluid through the tap, together with a rotating spindle that is enclosed within a sleeve attached to or formed integrally with the casing of the tap, the arrangement being such as to prevent the escape of fluid from the aperture in the casing through which the spindle passes.

27,143 of 1906.—T. H. LAMBERT and E. G. LAMBERT: *Reversible Windows.*

This relates to reversible windows, and comprises a spring-controlled bar working in grooves in the sashes or stiles in combination with a hollow pivot pin and means for actuating the bar.

27,820 of 1906.—J. BOOTH: *Ladders.*

This relates to a ladder with metallic rungs countersunk somewhat into the usual cheek pieces, and consists in clamping the cheek pieces together by means of bolts passing through the cheek pieces, and rungs and nuts corresponding to the bolts.

28,392 of 1906.—A. F. VON RÜGEN: *Foundations, for Bed Plates of Machines, Columns, and the like.*

This relates to foundations for bed plates of all kinds, and in particular of machines, and is characterised by the fact that the bed plate is arranged directly on a layer of india-rubber, gutta-percha, or other material of similar properties, without any other fixing means, for the purpose of producing a firm foundation by means of the rarefaction of the air produced by the movements or displacement of the object to be placed thereon or artificially by means of a suction pump.

28,402 of 1906.—T. KIRKLAND and F. H. COOKE: *Chargers, or Sliding Feed-carriages of Dry, Semi-dry, and Stiff Plastic Brick Machines.*

This relates to an arrangement of piping completely surrounding all the four sides of the chargers as used in dry, semi-dry, and stiff plastic brick machines, in which steam or hot gases may circulate, or in which combustible gases may be burnt.

4,651 of 1907.—T. GADDES, M.D.: *Window Sash Fastener.*

This relates to a window sash fastener, consisting of a pivoted eccentric lever, and consists in forming the inner end of the lever with trunnions, which are engaged by the curved arms of the trunnion plate.

7,691 of 1907.—W. S. ABELL: *Cooling or Heating of Buildings, Ships, and the like.*

This relates to a valve for use in cooling or heating buildings, ships, and the like, which, when properly automatically controlled, is capable of dividing a gas or liquid of varying temperature passing through it into two portions, such that when one portion is passed through the refrigerator or reheater and the remaining portion is passed uncooled or unheated, and the two portions are subsequently thoroughly mixed the temperature of the mixture is constant.

8,461 of 1907.—E. J. DOBBINS: *Light Distributors for Windows and the like.*

This relates to a light distributor for windows and the like, comprising glass rods made of cylindrical form and provided with longitudinal angular grooves, the walls of which are flat or curved, and which are filled with suitable light reflecting, refracting, or opaque material, for the purpose of securing the outer cylindrical form of the rods, and yet producing a total reflecting prismatic glass effect.

9,604 of 1907.—T. B. CULLEN: *Chimney-Tops and the like.*

This relates to a chimney-top or the like, characterised by the use of two concentric tubes leaving an air space between them and an open bottom to the outer tube, and consists in so arranging said outer tube with relation to the inner that the inner extends within the outer to about one-third its length, and in the combination with the tubes, of stays connecting said outer tube with the flange of the inner tube to permit of setting, whilst leaving air passages to said outer tube.

10,410 of 1907: W. SCHMITZ and P. M. KROPMANNS: *Pipe Wrenches.*

This relates to a pipe wrench, comprising in combination a shaft or handle, a fixed jaw integral with the top of said shaft, two bridges fixed to said shaft, a spindle designed to screw through said bridges, and a movable jaw fixed to the top of said spindle.

11,660 of 1907.—M. J. ADAMS: *Basins and Seats for Water-closets and Latrines.*

This relates to closet wherein the flushing rim stops short, leaving a space in front, and which has heightened sides raised above the flushing rim.

12,703 of 1907.—C. CABRINI: *Apparatus for Making Moles from Single Concrete Blocks.*

This relates to an apparatus for making moles from single blocks of concrete, consisting of a platform which can be moved on an elevated track of rails, a plate which may be lowered and raised, and rammers moving in guiding shafts, which can be raised and lowered and adjusted in the plate.

13,931 of 1907.—T. CROSS: *Manufacture of Building Blocks.*

This relates to the manufacture of hollow building blocks, more particularly for use in the construction of inside walls and partitions, and especially to that type of building block constructed of plaster of Paris or the like, in the interior of which a cavity is formed in course of manufacture by means of a shell, and consists in first placing removable rods or bars within a mould, pouring into said mould plaster of Paris or the like to a joint above said bars, pressing an open boxlike structure with its open side downwards upon said bars, so that it is sealed by the

plaster of Paris or the like above them, and subsequently filling the space between said box and sides of the mould and the space between the top of said box and the top of the mould with plaster of Paris or the like.

17,949 of 1906.—H. PECKNOLD: *Floatway System for the Permanent Erection of Floating Docks, Harbours, Breakwaters, Bridges, Promenades, and Tunnels.*

This relates to a floatway system for the permanent erection of floating docks, harbours, breakwaters, bridges, promenades, and tunnels, and consists of a number of floats built on the slip in pairs parallel to each other, and connected by several square bracket frames placed angularly between the floats, causing a space between the float, which, when launched, forms a waterway. Each float is one breadth and one depth throughout, and about the dimensions and formation of the mid-ship cross-section dimensions of an ordinary ship's hull. They are launched as a twin float, and are coupled to each other end to end, forming a line or floatway system of any length, straight or curved, according to the requirements. A sea-bed anchorage is formed of long iron moulds with a dovetail at one end and a claw at the other. A claw projects on either side of the moulds, also at the centre. The moulds interlock into each other and run in lines parallel to and a certain distance from each other on the sea-bed. Another mould with a dovetail at each end interlocks into the projecting central claws, which are opposite to each other between the parallel lines of moulds. Each mould is also provided with a ring. By the claw and dovetail interlocking method the moulds may spread in every direction on the sea-bed, the whole combining to form a sea-bed anchorage to which the floatway may be anchored by heavy cables.

18,718 of 1906.—G. H. BARTLETT: *Manufacture of Ornamented Concrete Bricks and the like.*

This relates to a method of making concrete articles having a polished surface, and consists in depositing concrete material, including hydraulic cement with an excess of water, in a mould having a glossy bottom panel, and allowing the same to remain in contact with said panel during the setting and draining of the water in the material, thereby causing the last hardening to take place in the portion of the article that is in contact with said panel, the said article remaining in contact with the panel until thoroughly hardened and dried and provided with a permanent polish.

23,718 of 1906.—J. G. BAXTER: *Steel Reinforcement for Concrete Construction.*

This relates to a form of bar of uniform sectional area for reinforcing concrete or the like made with perforated or slotted projections so as to prevent slipping of the enclosed concrete or other mass upon the bar or bars.

430 of 1907.—J. R. HITCHINS and W. DUNZ: *Concrete or other Compositions for use in Building and like Constructions.*

This relates to a fireproof and dampproof composition for use in the form of blocks or slabs or for use in the direct application as a plastic mass to walls, partitions, ironwork, and other structures, and comprises the mixture of an aggregate material and plaster of Paris with a solution of gelatine and a coagulating agent.

7,240 of 1907.—W. L. CHURCH: *Dams.*

This relates to an enclosing dam having a conduit extending downwardly from the up-stream side of the dam, and discharging in the lower portion of said space, means at the down-stream side of the dam for causing a forcible down-stream flow of the overfall, and means for connecting the tail water within the dam with the overfall current flowing from the dam, whereby an outflow of tail water from the interior of the dam is induced by the said overfall current.

12,234 of 1907.—THE CLEVELAND BRIDGE AND ENGINEERING COMPANY, LTD., and G. C. IMBAULT: *Bascule Bridges.*

This relates to a bascule bridge, and consists in the employment for raising and lowering the bascule of a motor carriage independent of the bascule, connected thereto by a link, adapted to travel to and fro on the permanent abutment of the bascule, and caused to thus move by the positive engagement with said abutment of a power-propelled rotary member mounted on the carriage, the latter being coupled to a point in the bascule such that, according as the carriage travels in the one or the other direction, a turning movement will be exerted upon the bascule to cause it to move angularly in a corresponding direction with reference to its permanent abutment.

MEETINGS.

WEDNESDAY, SEPTEMBER 4.

Builders' Foremen and Clerks of Works' Institution.—Ordinary meeting of the members. 8 p.m.

SATURDAY, SEPTEMBER 7.

Junior Institution of Engineers.—Visit to the Works of the Metropolitan Water Board, at Hampton-on-Thames. 3 p.m.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

August 7.—By SALTER, SIMPSON, & SONS (at Bury St. Edmunds).

Stanton, Suffolk.—New Hall Farm, etc., 167 a. 3 r. 5 p., f.	£1,517

By BIDDELL & BLENCOWE (at Bury St. Edmunds).

Lawshall, Suffolk.—Cooper's Farm, 48 a. 2 r. 5 p., f.	750
Wickhambrook, Suffolk.—Witham's Farm and Holding, 114 a. 3 r. 19 p., f.	795

August 12.—By RENDELL & SAWDYE (at Newton Abbot).

Broadhempston, Devon.—Outlying portions of the Ogwell Estate, 403 a. 2 r. 37 p., f.	10,665

August 14.—By STANFORD & BROOM (at Harleston).

Mendham, Suffolk.—The Mendham Priory Estate, 140 a. 1 r. 10 p., f.	6,035

August 15.—By DANIEL SMITH, SON, & OAKLEY (at Banbury).

Epwell, Oxon.—Epwell Grounds Farm 197 acres, f.	5,150

August 19.—By JOSHUA WALKER & SON (at Retford).

Clayworth, Notts.—A portion of Clayworth Hall Estate, 96 a. 1 r. 35 p., f.	5,380

By CHINNOCK, CLARKE, & CHINNOCK (at Abingdon).

Milton, Berks.—The Home Farm and enclosures of land, 27 a. 2 r. 10 p., f. and c.	1,665

August 22.—By HILLYER & HILLYER.

West Green.—135, West Green-rd., u.t. 16 yrs., g.r. 11*l.* 10s., e.r. 40*l.*	130

By NEWBON, SHEPHARD, & EDWARDS.

Islington.—25, Union-sq., u.t. 29 yrs., g.r. 7*l.* 15s., y.r. 50*l.*	295
31, St. Paul's-st., u.t. 20 yrs., g.r. 3*l.* 3s., y.r. 35*l.*	170
14, Packington-st., u.t., 29 yrs., g.r. 7*l.*, e.r. 48*l.*	260
Holloway.—3, Ingleby-rd., u.t. 42 yrs., g.r. 6*l.*, e.r. 34*l.*	245
Barnsbury.—19, Thornhill-sq., u.t. 38 yrs., g.r. 7*l.*, p.	350
Holloway.—59 and 61, Cheverton-rd., f., y.r. 72*l.*	815
Cheverton-rd, f.g.r. 7*l.*, reversion in 80 yrs.	160
3, St. John's-villas, u.t. 41 yrs., g.r. 4*l.* y.r. 26*l.*	295

Contractions used in this list.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. beerhouse; p.h. for public-house; o. for office; s. for shops; ct. for court.

PUBLISHER'S NOTICES.

Nat. Tel., 6112 Gerrard. Telegrams, "The Builder, London."

THE INDEX (with TITLE-PAGE) for VOLUME XCII. (January to June, 1907) was given as a supplement with the issue for July 13.

CLOTH CASES for Binding the Numbers are now ready, price 2s. 6d. each; also

READING CASES (Cloth), with Strings price 9d. each,

THE NINETY-SECOND VOLUME of "The Builder" (bound), price Twelve Shillings and Sixpence.

SUBSCRIBERS' VOLUMES, on being sent to the Office, will be bound at a cost of 3s. 6d. each.

CHARGES FOR ADVERTISEMENTS.

COMPETITIONS, CONTRACTS, ALL NOTICES ISSUED BY CORPORATE BODIES, COUNTY AND OTHER COUNCILS, PROSPECTUSES OF PUBLIC COMPANIES, SALES BY TENDER, LEGAL ANNOUNCEMENTS, etc., etc.

Six lines or under ..... 6s. 0d.
Each additional line ..... 1s. 0d.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

Terms for series of Trade advertisements, and for front page and other special positions, on application to the Publisher.

SITUATIONS WANTED (Single-handed—Labour only).

Four lines (about thirty words) or under ..... 2s. 6d.
Each additional line (about ten words) ..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all sums should be remitted by Postal Orders, payable to J. MORGAN, and addressed to the Publisher of "THE BUILDER," 4, Catherine Street, W.C.

Advertisements for the current week's issue are received up to ONE p.m. on THURSDAY, but "Classification" is impossible in the case of any which may reach the Office after TWELVE NOON on that day. Those intended for the Outside Wrapper should be in by TWELVE NOON on WEDNESDAY.

ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY MORNING.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, etc., left at the Office in reply to advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

ADVERTISERS in "THE BUILDER" may have *Replies addressed to the Office*, 4, Catherine Street, Covent Garden, W.C., *free of charge*. Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage. Unused stamps are returned to advertisers the week after publication.

N.B.—The Reply Boxes are not intended for trade lists, circulars, and the like; should these be received, they cannot (if noticed) be forwarded.

AN EDITION Printed on THIN PAPER, for FOREIGN and COLONIAL CIRCULATION, is issued every week.

READING CASES { NINEPENCE EACH. By post (carefully packed) 1s.

TO CORRESPONDENTS.

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications; and the Editor cannot be responsible for drawings, photographs, manuscripts, or other documents, or for models or samples, sent to or left at this office, unless he has specially asked for them.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance. The Editor cannot undertake to read and consider articles offered for acceptance unless they are type-written.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

PRICES CURRENT OF MATERIALS.

*** **Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and quantity obviously affect prices—a fact which should be remembered by those who make use of this information.**

	£ s. d.		
BRICKS, &c.			
Hard Stocks	1 7 0	per 1000 alongside, in river.	
Rough Stocks and Grizzles	1 6 0	,,	,,
Picked Stocks for Facings	2 10 0	,,	delivered.
Flettons	1 6 0	,,	at railway depôt.
Red Wire Cuts	1 14 0	,,	,,
Best Fareham Red	3 12 0	,,	,,
Best Red Pressed Ruabon Facing	5 0 0	,,	,,
Best Blue Pressed Staffordshire	3 15 0	,,	,,
Do. Bullnose	4 0 0	,,	,,
Best Stourbridge Fire Bricks	3 14 0	,,	,,
GLAZED BRICKS.			
Best White and Ivory Glazed Stretchers	12 0 0	,,	,,
Headers	11 0 0	,,	,,
Quoins, Bullnose, and Flats	16 0 0	,,	,,
Double Stretchers	19 0 0	,,	,,
Double Headers	16 0 0	,,	,,
One Side and two Ends	19 0 0	,,	,,
Two Sides and one End	20 0 0	,,	,,
Splays, Chamferred, Squints	20 0 0	,,	,,
Best Dipped Salt Glazed Stretchers, and Header	12 0 0	,,	,,
Quoins, Bullnose, and Flats	14 0 0	,,	,,
Double Stretchers	15 0 0	,,	,,
Double Headers	14 0 0	,,	,,
One Side and two Ends	15 0 0	,,	,,
Two Sides and one End	15 0 0	,,	,,
Splays, Chamferred, Squints	14 0 0	,,	,,
Second Quality White and Dipped Salt Glazed	2 0 0	,,	less than best.

	s. d.	
Thames and Pit Sand	7 0	per yard, delivered.
Thames Ballast	5 6	,, ,,
Best Portland Cement	28 0	per ton, ,,
Best Ground Blue Lias Lime	19 0	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime ..... 11s. 6d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 0d. per ton at rly. dpt.

STONE.

	s. d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1 6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1 8½	,, ,,
PORTLAND STONE (20 ft. average)—Brown Whitbed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 1	,, ,,
White Basebed, delivered on road waggons, Paddington Depôt, Nine Elms Depôt, or Pimlico Wharf	2 2½	,, ,,

	s. d.	
Ancaster in blocks	1 10	per ft. cube, deld. rly. depôt.
Beer ,,	1 6	,, ,,
Greenshill ,,	1 10	,, ,,
Darley Dale in blocks	2 4	,, ,,
Red Corsehill ,,	2 2	,, ,,
Closeburn Red Freestone	2 0	,, ,,
Red Mansfield ,,	2 4	,, ,,
YORK STONE—*Robin Hood Quality.*		
Scappled random blocks	2 10	,, ,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2 3	per ft. super., ,,
6 in. rubbed two sides ditto, ditto	2 6	,, ,,

STONE (*continued*).

YORK STONE—*Robin Hood Quality (continued)*—

3 in. sawn two sides slabs (random sizes)	0	11½	per ft.super.deld.rly.dep.	
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	,,	,,
1½ in. to 2 in. ditto, ditto	0	6	,,	,,
HARD YORK—				
Scappled random blocks.	3	0	per ft. cube,	,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	8	per ft. super.	,,
6 in. rubbed two sides ditto	3	0	,,	,,
3 in. sawn two sides slabs (random sizes)	1	2	,,	,,
2 in. self-faced random flags	0	5	,,	,,

SLATES.

In. In.	£	s.	d.	
20×10 best blue Bangor	13	2	6	per 1000 of 1200 at r. d.
20×12 ,, ,,	13	17	6	,, ,,
20×10 first quality ,,	13	0	0	,, ,,
20×12 ,, ,,	13	15	0	,, ,,
16×8 ,, ,,	7	5	0	,, ,,
20×10 best blue Portmadoc	12	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,
20×10 best Eureka unfading green	15	17	6	,, ,,
20×12 ,, ,,	18	7	6	,, ,,
18×10 ,, ,,	13	5	0	,, ,,
16×8 ,, ,,	10	5	0	,, ,,
20×10 permanent green	11	12	6	,, ,,
18×10 ,, ,,	9	12	6	,, ,,
16×8 ,, ,,	6	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt
Hip and Valley tiles	3	7	per doz. ,,
Best Broseley tiles	50	0	per 1000 ,,
Do. Ornamental tiles	52	6	,, ,,
Hip and Valley tiles	4	0	per doz. ,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	,, ,,
Do. Ornamental do.	60	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	0	,, ,,
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 ,,
Do. Ornamental do.	54	6	,, ,,
Hip tiles	4	1	per doz. ,,
Valley tiles	3	8	,, ,,
Best "Rosemary" brand plain tiles	48	0	per 1000 ,,
Best Ornamental tiles	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	8	,, ,,
Best "Hartshill" brand plain tiles, sand-faced	50	0	per 1000 ,,
Do. pressed	47	6	,, ,,
Do. Ornamental do.	50	0	,, ,,
Hip tiles	4	0	per doz. ,,
Valley tiles	3	6	,, ,,

WOOD.

BUILDING WOOD.	At per standard.					
	£	s.	d.		£	s. d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in.	13	10	0	...	15	0 0
Deals: best 3 by 9	13	0	0	...	14	0 0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	0	0	...	12	0 0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best.		
Battens: seconds	0	10	0	,, ,,		
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	...	10	0 0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	...	9	10 0
Foreign Sawn Boards—						
1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		

	At per load of 50 ft.					
Fir timber: best middling Danzig or Memel (average specification)	4	10	0	...	5	0 0
Seconds	4	0	0	...	4	10 0
Small timber (8 in. to 10 in.)	3	12	6	...	3	15 0
Small timber (6 in. to 8 in.)	3	0	0	...	3	10 0
Swedish balks	2	10	0	...	3	0 0
Pitch-pine timber (30 ft. average)	4	0	0	...	4	15 0

JOINERS' WOOD.	At per standard.					
White Sea: first yellow deals, 3 in. by 11 in.	24	0	0	...	25	0 0
3 in. by 9 in.	22	0	0	...	23	0 0
Battens, 2½ in. and 3 in. by 7 in.	16	10	0	...	18	0 0
Second yellow deals, 3 in. by 1 in.	18	10	0	...	20	0 0
,, ,, 3 in. by 9 in.	17	10	0	...	19	0 0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	...	14	10 0
Third yellow deals, 3 in. by 11 in. and 9 in.	13	10	0		15	0 0
Battens, 2½ in. and 3 in. by 7 in.	11	0	0	...	12	0 0
Petersburg first yellow deals, 3 in. by 11 in.	21	0	0		22	10 0
Do. 3 in. by 9 in.	18	0	0	...	19	10 0
Battens	13	10	0	...	15	0 0
Second yellow deals, 3in. by 11in.	16	0	0		17	0 0
Do. 3 in. by 9 in.	14	10	0		16	0 0
Battens	11	0	0		12	10 0
Third yellow deals, 3 in. by 11 in.	13	0	0		14	0 0
Do. 3 in. by 9 in.	12	10	0		14	0 0
Battens	10	0	0	...	11	0 0
White Sea and Petersburg—						
First white deals, 3 in. by 11 in.	14	10	0	...	15	10 0
,, ,, 3 in. by 9 in.	13	10	0	...	14	10 0
Battens	11	0	0	...	12	0 0
Second white deals, 3 in. by 11 in.	13	10	0	...	14	10 0
,, ,, 3 in. by 9 in.	12	10	0	...	13	10 0
,, ,, battens	10	0	0	...	11	0 0
Pitch-pine: deals	18	J	0	...	21	0 0
Under 2 in. thick extra	0	10	0	...	1	0 0
Yellow Pine—First, regular sizes	44	0	0	upwards.		
Oddments	32	0	0	,,		
Seconds, regular sizes	33	0	0	,,		
Yellow Pine oddments	28	0	0	,,		
Kauri Pine—Planks, per ft. cube	0	3	6	...	0	5 0

WOOD (*continued*).

JOINERS' WOOD (*continued*)—	At per standard.					
Danzig and Stettin Oak Logs—	£	s.	d.		£	s. d.
Large, per ft. cube	0	3	0	...	0	3 6
Small ,, ,,	0	2	6	...	0	4 5
Wainscot Oak Logs, per ft. cube	0	5	6	...	0	6 0
Dry Wainscot Oak, per ft. sup. as inch	0	0	8½	...	0	0 ½
¾ in. do. do	0	0	7	...		—
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	...	0	1 0
Selected, Figury, per ft. super. as inch	0	1	6	...	0	2 6
Dry Walnut, American, per ft. super. as inch	0	0	10	...	0	1 0
Teak, per load	17	0	0	...	22	0 0
American Whitewood Planks, per ft. cube	0	4	0	...	0	5 0
Prepared Flooring, etc.—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	6	...	0	17 6
1 in. by 7 in. yellow, planed and matched	0	14	0	...	0	18 0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	...	1	0 0
1 in. by 7 in. white, planed and shot	0	12	0	...	0	14 6
1 in. by 7 in. white, planed and matched	0	12	6	...	0	15 0
1¼ in. by 7 in. white, planed and matched	0	15	0	...	0	16 6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	...	0	13 6
1 in. by 7 in. ,, ,,	0	14	0	...	0	18 0
¾ in. by 7 in. white ,, ,,	0	10	0	...	0	11 6
1 in. by 7 in. ,, ,, ,,	0	12	9	...	0	15 0

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton.					
Rolled Steel Joists, ordinary sections	£	s.	d.	...	£	s. d.
	7	7	6	...	7	15 0
Compound Girders, ordinary sections	9	10	0	...	10	10 0
Steel Compound Stanchions	12	5	0	...	13	5 0
Angles, Tees, and Channels, ordinary sections	9	5	0	...	10	5 0
Flitch Plates	9	5	0	...	10	5 0
Cast Iron Columns and Stanchions including ordinary patterns	8	0	0	...	9	0 0

METALS.

	Per ton, in London.					
IRON—	£	s.	d.		£	s. d.
Common Bars	8	10	0	...	9	0 0
Staffordshire Crown Bars, good merchant quality	9*	5	0	...	9	15 0
Staffordshire "Marked Bars"	11	0	0	...		—
Mild Steel Bars	9	10	0	...	9	15 0
Hoop Iron, basis price	9	15	0	...	10	0 0
,, ,, Galvanised	17	10	0	...		—
(*And upwards, according to size and gauge.)						
Sheet Iron Black—						
Ordinary sizes to 20 g.	10	0	0	...		—
,, ,, 24 g.	11	0	0	...		—
,, ,, 26 g.	12	10	0	...		—
Sheet Iron, Galvanised, flat, ordinary quality—						
Ordinary sizes, 6 ft. by 2 ft. to 3 ft. to 20 g.	16	0	0	...		—
Ordinary sizes to 22 g. and 24 g.	16	10	0	...		—
,, ,, 26 g.	17	0	0	...		—
Sheet Iron, Galvanised, flat, best quality—						
Ordinary sizes to 20 g.	19	0	0	...		—
,, ,, 22 g. and 24 g.	19	10	0	...		—
,, ,, 26 g.	21	0	0	...		—
Galvanised Corrugated Sheets—						
Ordinary sizes 6 ft. to 8 ft. 20 g.	16	0	0	...		—
,, ,, 22 g. and 24 g.	16	5	0	...		—
,, ,, 26 g.	17	10	0	...		—
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	13	0	0	...		—
Best Soft Steel Sheets, 22 g. & 24 g.	14	0	0	...		—
,, ,, ,, 26 g.	16	0	0	...		—
Cut Nails, 3 in. to 6 in.	10	15	0	...	11	5 0

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London					
	£	s.	d.		£	s. d.
LEAD—Sheet, English, 3lb. and up.	23	0	0	...		—
Pipe in coils	23	10	0	...		—
Soil pipe	25	10	0	...		—
Compo pipe	26	10	0	...		—
ZINC—Sheet—						
Vieille Montagne ton	32	10	0	...		—
Silesian	32	5	0	...		—
COPPER—						
Strong Sheet per lb.	0	1	4	...		—
Thin ,, ,,	0	1	5	...		—
Copper nails ,,	0	1	3	...		—
BRASS—						
Strong Sheet ,,	0	1	2	...		—
Thin ,, ,,	0	1	3	...		—
TIN—English Ingots ,,	0	1	11	...		—
SOLDER—Plumbers' ,,	0	0	9	...		—
Tinmen's ,,	0	0	11	...		—
Blowpipe ,,	0	1	1	...		—

ENGLISH SHEET GLASS IN CRATES OF STOCK SIZES.

5 oz. thirds	2½d.	per ft. delivered
,, fourths	1⅞d.	,, ,,
21 oz. thirds	3½d.	,, ,,
,, fourths	2⅝d.	,, ,,
26 oz. thirds	4¼d.	,, ,,
,, fourths	3¼d.	,, ,,
32 oz. thirds	5d.	,, ,,
,, fourths	4⅛d.	,, ,,
Fluted Sheet, 15 oz.	3⅛d.	,, ,,
,, 21 oz.	4⅛d.	,, ,,

ENGLISH ROLLED PLATE IN CRATES OF STOCK SIZES.

⅛ Hartley's	2½d.	per ft. delivered
¼ ,,	2½d.	,, ,,
⅜ ,,	3d.	,, ,,
Figured and Oxford Rolled "Oceanic" Glass, white	4d.	,, ,,
Do. ,, tinted	5½d.	,, ,,

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes	per gallon	0	2	1
,, ,, ,, in barrels	,,	0	2	2
,, ,, ,, in drums	,,	0	2	4
Boiled ,, ,, in pipes	,,	0	2	3
,, ,, ,, in barrels	,,	0	2	4
,, ,, ,, in drums	,,	0	2	5
Turpentine in barrels	,,	0	3	5
,, in drums	,,	0	3	7
Genuine Ground English White Lead	per ton	26	10	
Red Lead, Dry	,,	24	10	0
Best Linseed Oil Putty	per cwt.	0	7	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.

	Per gallon		
	£	s.	d.
Fine Pale Oak Varnish	0	8	0
Pale Copal Oak	0	10	6
Superfine Pale Elastic Oak	0	12	6
Fine Extra Hard Church Oak	0	10	0
Superfine Hard-drying Oak, for seats of Churches	0	14	0
Fine Elastic Carriage	0	12	6
Superfine Pale Elastic Carriage	0	16	0
Fine Pale Maple	0	16	0
Finest Pale Durable Copal	0	18	0
Extra Pale French Oil	1	1	0
Eggshell Flatting Varnish	0	18	0
White Copal Enamel	1	4	0
Extra Pale Paper	0	12	0
Best Japan Gold Size	0	10	6
Best Black Japan	0	16	0
Oak and Mahogany Stain	0	9	0
Brunswick Black	0	8	0
Berlin Black	0	16	0
Knotting	0	10	0
French and Brush Polish	0	16	0

TERMS OF SUBSCRIPTION.

"THE BUILDER" (Published Weekly) is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum, and Canada 21s. 8d. (52 numbers) PREPAID. To all parts of Europe, America, Australia, New Zealand, India, China, Ceylon, etc., 26s. per annum.

Remittances (payable to J. MORGAN) should be addressed to The Publisher of "THE BUILDER," 4, Catherine-street, W.C.

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office 19s. per annum (52 numbers) or 4s. 9d. per quarter (13 numbers), can ensure receiving "The Builder" by *Friday Morning's Post*.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays*. [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is stated, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

*** Denotes *accepted*. † Denotes *provisionally accepted*.**

BALLYBAY (Ireland).—For sewage works, for Castleblayney Rural District Council. Mr. F. Bergin, B.E., 36, Westmoreland street, Dublin:—

R. Smith	£2,877 14 9	P. Ritchie,	
Grainger Bros.	2,859 16 11	Belfast*	£2,323 0 0
J. Wynne	2,838 15 0	J. Louden & Co.	2,297 12 7
J. Callan	2,838 12 10		

CHESHAM.—For private street works, Severalls-avenue, for the Urban District Council. Mr. P. C. Dormer, Engineer and Surveyor, Council Offices Chesham:—

W. Y. Green & Co.	£998 10	T. Free & Sons	
A. Mead & Son	990 0	Maidenhead*	£965 0
A. F. Lee	966 0		

DENTON.—For school works. Messrs. Lacey & Upcher, architects, Norwich. Quantities by the architects:—

A. F. Rayner	£305 0 0	Ebbs & Barton	£235 18 4
R. Morriss	298 8 0	M. A. Redgrave,	
R. J. Dowe	290 7 0	Bergh Apton*	183 18 0
H. A. Hipperson	269 0 0		

GOSPORT.—For asphalting and tar-paving, for the Urban District Council of Gosport and Alverstoke. Mr. H. Frost, Surveyor, Town Hall, Gosport. Quantities by Surveyor to the Council:—

Mendip & Co.	£1,691 0
Seyssel and Metallic Lava Asphalte Co.	1,437 7
Adamant and Asphalte, Ltd.	1,225 0
Standard & Co.	1,203 0
Bradshaw & Co., Portsmouth*	1,115 0
Downside & Co.	1,113 0
C. G. German‡	845 10

‡ Tarpaving only.

HARWICH.—For alterations to the Esplanade Boys' School, for the Education Committee:

E. Saunders, Dovercourt* £315

HEYSHAM.—For sewering, levelling, paving, etc., of Marlborough-road, for the Urban District Council. Mr. H. Miller, Surveyor, Heysham, Morecambe. Quantities by Surveyor:—

J. Johnson	£554 18 5
Frith & Pendleton	505 12 1
D. Hinchcliffe & Co.	499 0 0
J. S. Jackson, 10, Cavendish-road, Heysham*	483 10 0

HOLT.—For restoration to tower and new turret stair, Holt Church, Norfolk. Mr. Herbert J. Green, Architect and Diocesan Surveyor. 31, Castle-meadow, Norwich:—

C. T. Baker & Co.	£961 4	R. Shanks, Chatteris	
R. Chapman	823 0	and Hunstanton†	£689 0
J. S. Smith	752 0		

INGOLDISTHORPE.—For alterations and additions to schools. Mr. Herbert J. Green, Architect and Diocesan Surveyor, 31, Castle-meadow, Norwich:—

Chambers & Son	£600 0	R. Shanks, Chatteris	
G. Riches	586 9	and Hunstanton†	£533 0

KNOWLE.—For erecting a house at Knowle, in the county of Warwickshire, for Mr. Harold Hasluck. Messrs. Hickton & Farmer, architects, Walsall:—

T. Mason	£3,335	P. F. J. Briley	£3,138
W. Hopkins	3,300	W. Wistance	3,125
T. Elvins	3,190	W. Kendrick & Son*	3,100

EPPING.—For new system of drains and for alterations at the workhouse, for the Guardians. Mr. H. Tooley, F.R.I.B.A., Buckhurst Hill:—

—	Part 1.	Part 2.	Part 3.	
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
G. Jennings	979 17 0	286 7 0	431 7 6	1,697 11 6
W. H. Hyde & Co.	1,050 0 0	252 0 0	330 0 0	1,632 0 0
J. Stewart	870 0 10	194 16 11	277 5 3	1,342 3 0
W. M. Glendinning	895 0 0	205 0 0	220 0 0	1,320 0 0
Stevens & Sons	781 0 0	179 0 0	298 0 0	1,258 0 0
B. Cowlin & Sons	754 8 1	167 4 1	270 2 4	1,191 14 6
A. E. Hubbard	799 15 0	185 0 0	197 0 0	1,181 15 0
C. S. Foster & Son	699 0 0	180 0 0	281 0 0	1,160 0 0
J. S. Limn & Co.	675 0 0	187 0 0	285 0 0	1,147 0 0
E. E. Winch	691 0 0	180 0 0	272 0 0	1,143 0 0
W. & C. French	650 0 0	190 0 0	240 0 0	1,080 0 0
J. Whiffen & Sons	650 15 0	152 14 0	260 1 0	1,063 10 0
Architect's estimate	692 0 0	163 0 0	285 0 0	1,140 0 0
P. Wood, Epping*	559 0 0	170 0 0	250 10 0	979 10 0

KENDAL.—For the erection of the Carnegie Library (accepted tenders subject to the architect reducing the cost by £254). Mr. T. Fredk. Pennington, A.R.I.B.A., architect, Tivoli House, Hounslow Heath, London, W. Quantities by the architect:—

Walling, Masonry, Slating: R. T. Pennington	£2,350	0 0
Carpenter and Joiners: E. & A. Nelson	1,080	0 0
Plastering: J. Steel & Co.	269	19 0
Plumbing: W. Parsons	199	8 0
Painting and Glazing: W. Brown	191	9 6
Total	£4,590	16 6

[All of Kendal].

[The reduction has been made, and the building is at once to be carried out under the superintendence of the architect.]

LONDON.—For painting and decorating board-room, Marloes-road, Kensington, for Kensington Guardians. Mr. E. Flint, architect, 80, Coleman-street, E.C. Quantities by Mr. V. A. Edlin, 4, Finsbury-circus:—
P. McCarthy, 15, New King's-road, Fulham* £65 10

LONDON COLNEY.—For building orphanage at All Saints' Convent London Colney, near St. Albans, Herts. Mr. Ernest Willmott, F.R.I.B.A, 14, South-square, Gray's-inn, W.C. Quantities by Messrs. Young & Brown, 104, High Holborn, W.C.:—

Benfield & Loxley	£10,984
Holloway Bros.	10,200
A. Monk	10,000
E. Lawrence & Sons	9,841
L. H. & R. Roberts	9,787
Wagstaffe & Sons	9,662
Johnson & Co., Ltd.	9,646
Miskin & Sons	9,550
A. Fairhead & Son	9,167
W. Lawrence & Son	8,972
Mattock & Parsons, 165, Gray's Inn-road, W.C.*	8,971

MORLEY.—For erecting a warehouse at Deanfield Mills, for Mr. J. Barker. Messrs. T. A. Buttery & S. B. Birds, architects, 1, Basinghall-square, Leeds; and at Morley:—

Mason: H. Spensley, Morley*	£700 14 11
Joiner: A. Furness, Morley*	651 0 0
Plumber: J. W. Stakes, Morley*	37 10 0
Plasterers: J. Iredale & Son, Birstall*	96 8 10
Slater: J. Kellett, Morley*	94 0 0

SHEFFIELD.—For the erection of additional class-rooms to Bethel Primitive Methodist Chapel, Carbrook, Sheffield, for the trustees. Mr. H. L. Paterson, A.R.I.B.A, 19, St. James'-street, Sheffield:—

H. Turton	£566 0 0	T. Roper & Sons, Ltd.	£527 12 0
R. Charlesworth	545 5 6	C. Portass	524 8 0
Vasey & Son	539 0 0	P. Weston	514 7 6
C. Ward	537 18 9	Marlow & Sons	513 0 0
J. White & Son	535 0 0	A. Bradbury	505 0 0
J. & H. Wheen	532 10 0	J. I. Robertson*	500 0 0

[All of Sheffield.]

SPILSBY.—For additions to Council offices, for the Rural District Council. Mr. J. E. Bolt, Sanitary Surveyor, Spilsby:—
F. G. Rattenbury, Spilsby* £285

STREETLY.—For the erection of a house, for Mr. J. Scott, J.P. Messrs. Hickton & Farmer, architects, Walsall:—

Turville & Son	£1,463	Hall & Son	£1,370
Brockhurst & Wood	1,429	T. Mason	1,365
S. Wootton & Son	1,425	T. Elvins	1,350
W. Kendrick & Son	1,400	Streather & Hill*	1,290

WALKLEY.—For the conversion of Council school in Greaves-street into a boys' and girls' school, for Sheffield Education Committee. Mr. H. L. Paterson, A.R.I.B.A., 19, St. James'-street, Sheffield:—

J. White & Sons	£2,460 0	R. Charlesworth	£2,287 15
T. Roper & Sons, Ltd.	2,419 10	Dawson & Jones	2,242 0
H. Turton	2,416 0	J. Eshelby & Son	2,235 0
D. O'Neill & Son	2,360 0	Vasey & Son	2,171 15
J. Wise & Sons	2,342 9	A. Bradbury	2,140 0
		J. & H. Wheen‡	2,130 0

[All of Sheffield.]

‡ Accepted subject to approval of Local Government Board.

WEALDSTONE.—For the erection of a police-station and Petty Sessional court at Wealdstone. Mr. J. Dixon Butler, F.R.I.B.A., Surveyor to the Metropolitan Police, New Scotland Yard, S.W. Quantities by Messrs. Thurgood, Son, & Chidgey, Charing Cross-chambers, Duke-street, Adelphi:—

H. Brown	£9,797	Lathey Bros.	£8,447
H. Haynes	9,380	Fassnidge & Son	8,373
E. & J. Waterman	9,047	Fairhead & Son	8,344
J. C. Rackham	8,980	Grover & Son	8,262
E. Potterton	8,822	H. Lovatt, Ltd.	8,255
Holloway Bros.	8,808	Godson & Son	8,077
Higgs & Hill	8,522		

WHITLEY BAY.—For the south-eastern extension of marine promenade, for the Whitley and Monkseaton Urban District Council. Mr. J. Moore, Surveyor, Council-buildings, Whitley Bay:—
W. Gray, Whitley. Schedule prices.

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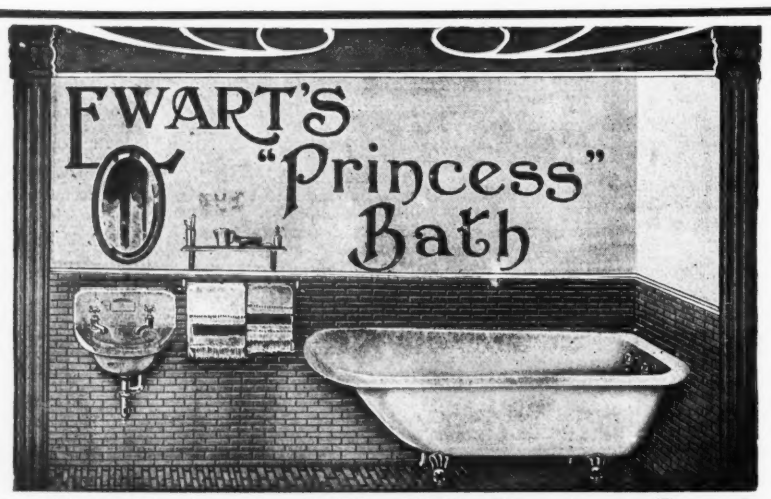

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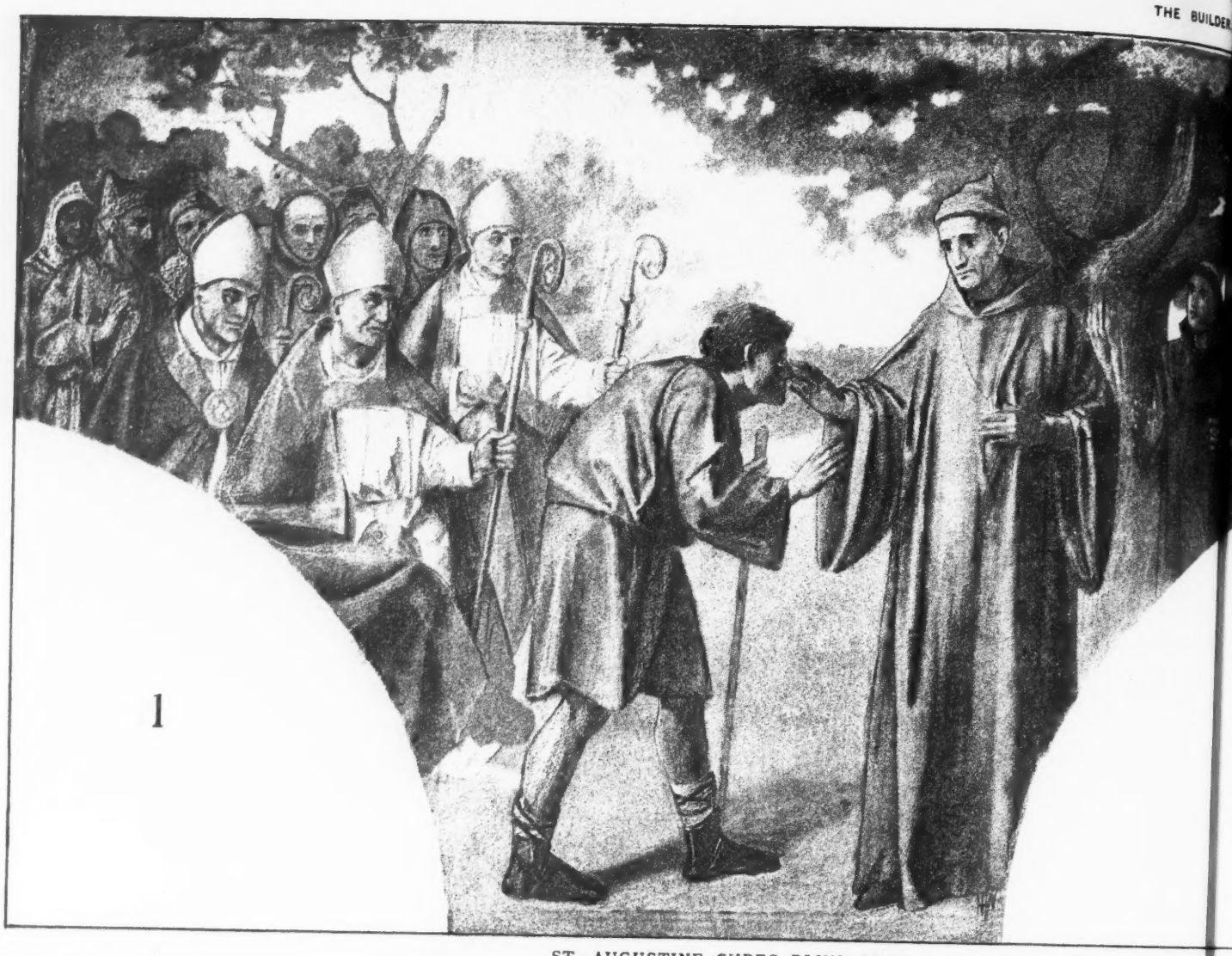

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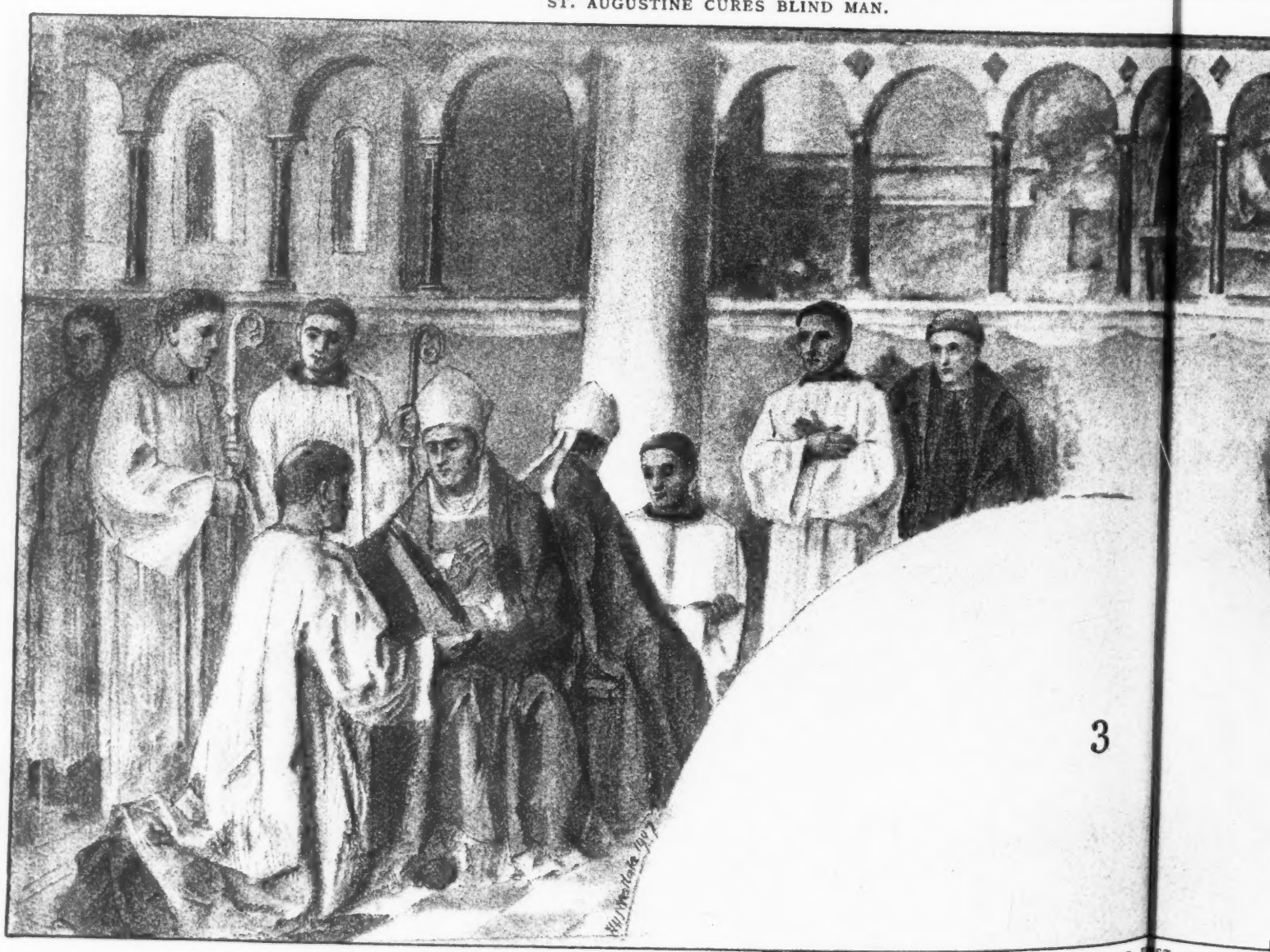

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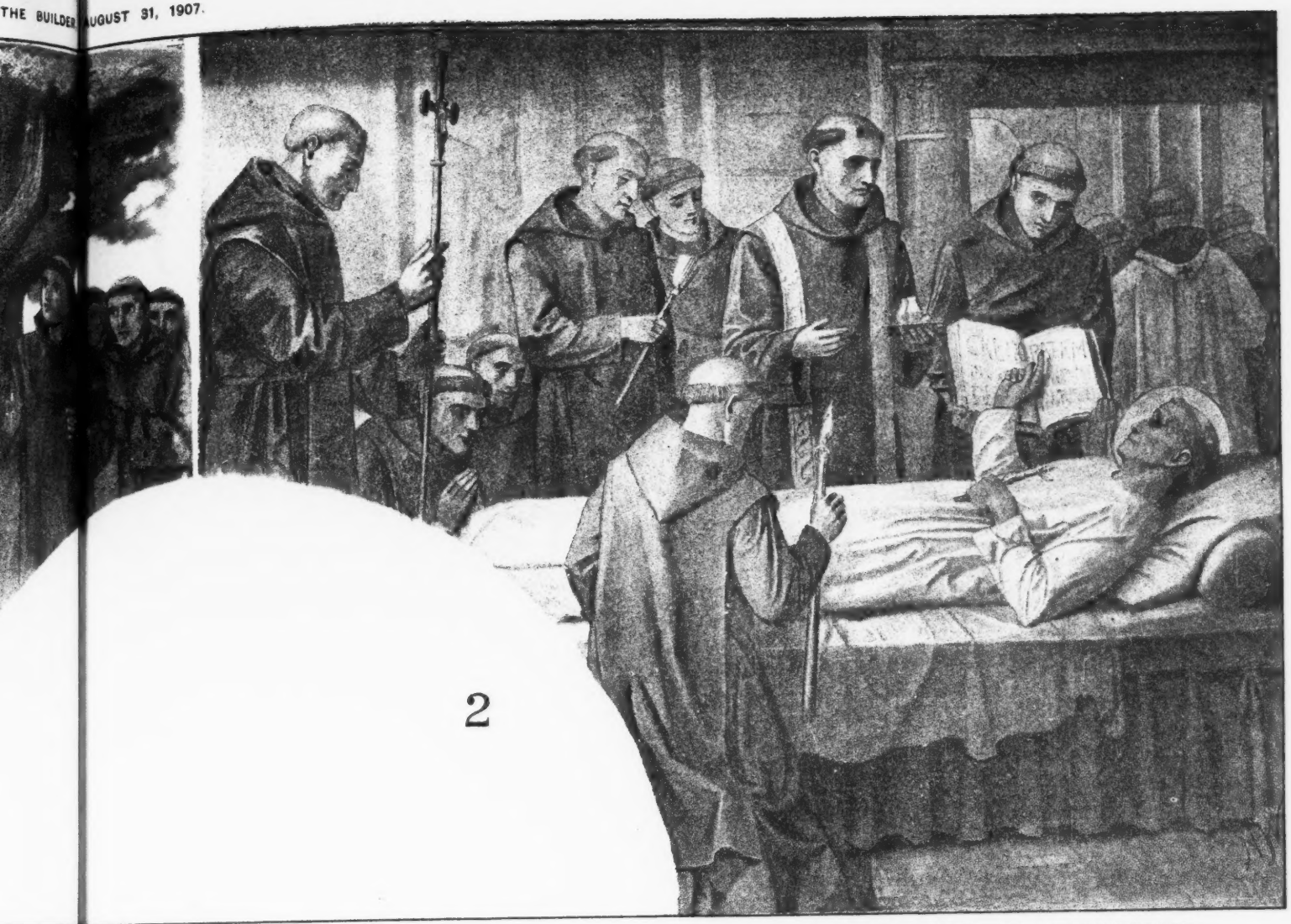

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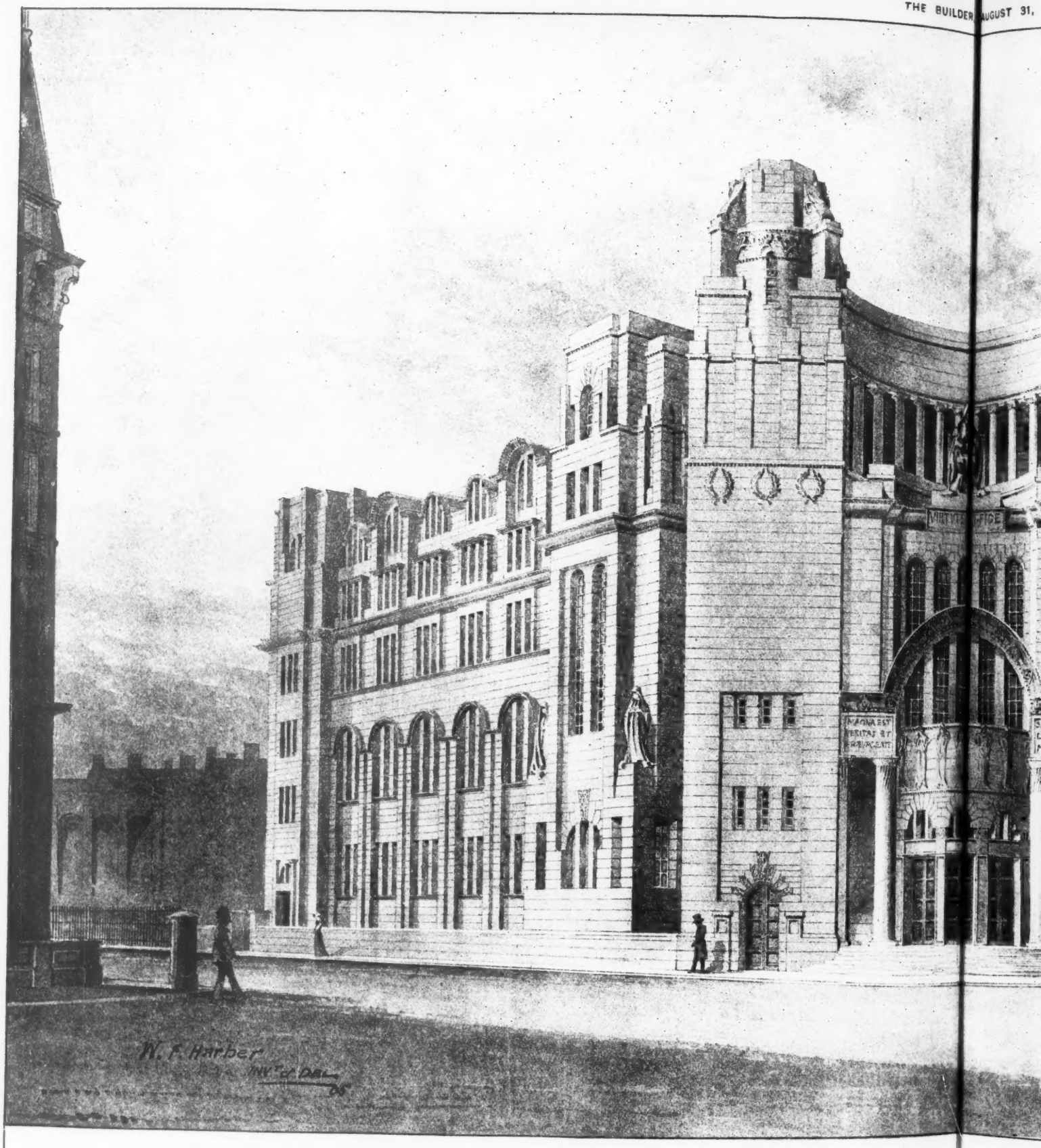

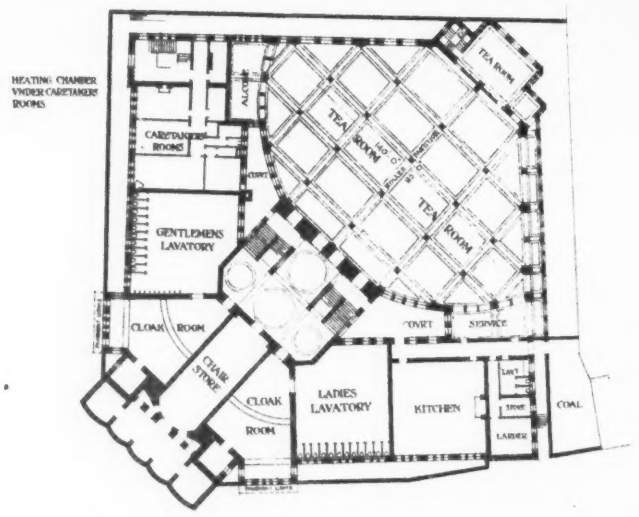

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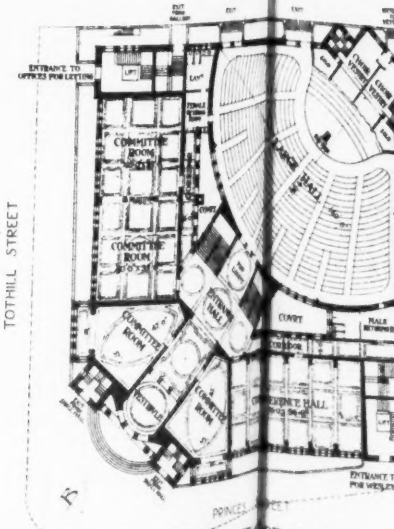

GROUND FLOOR PLAN

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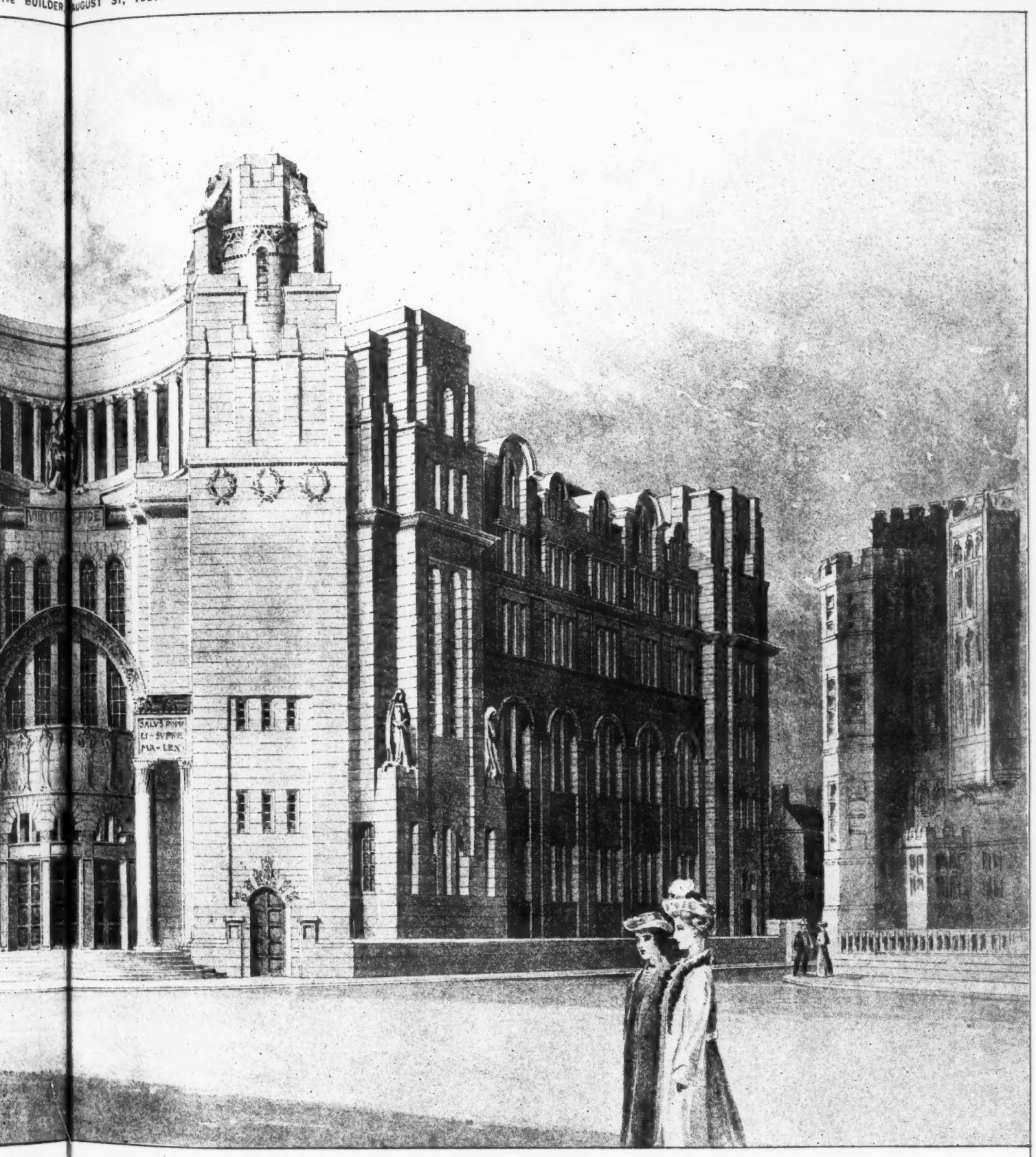

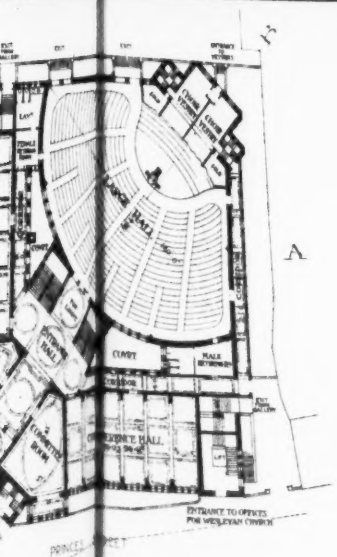

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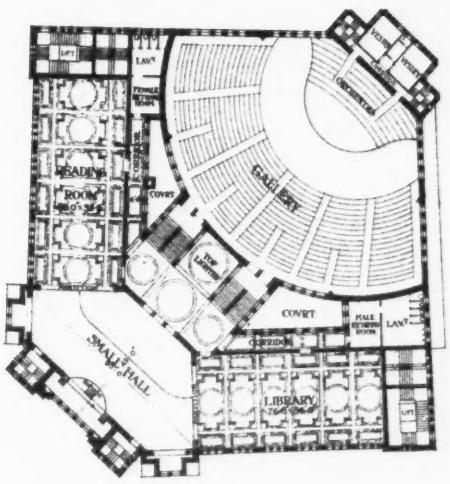

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